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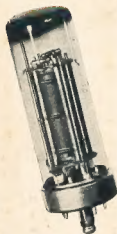
1950

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EDITORIAL**EMERGENCY NETWORKS**

EMERGENCY—What does it mean? "A pressing necessity" is one of its meanings which is applicable to Amateur Radio in all times of a National or State crisis.

As this Editorial is being written the first day of summer has past and with it fast approaches one of this country's greatest and costliest of all crises—**BUSHFIRES**.

To help one of the noblest volunteer services rendered mankind—the Bush Fire Brigades—the Wireless Institute of Australia, through its various Divisions, has formed Emergency Networks which have been already in successful operation in other spheres of activity, viz.: rescue work in locating missing persons and more recently the N.S.W. floods—and have received recognition of their worth. This has been due mainly to the efforts of "the few."

No organisation can render a truly worthwhile effort if it is understaffed, therefore, we appeal to each and every Amateur to give serious consideration to putting his "voice and fist" into

this phase of the Amateur Service. You may be one of the boys who will be going portable at this time of the year, or a potential participant in the National Field Day on the 30th of this month, your gear, therefore, will be prepared and in readiness. So why not enrol in your Division's network? Exercises, in the main, are conducted at week-ends on the special frequencies of 3501 Kc. and 7002 Kc. and will not entail much of your time.

From amongst the proud owners of the many and varied types of the small transceivers and the like, procured from disposals sources, it is felt that there is still quite a large number who have not as yet experienced the thrill of portable working. If you are one of these let your Divisional Emergency Network Co-ordinator have your application for membership immediately and join the ranks of those Amateurs whose motto could be "We Serve," whilst to the others we say, "Be Prepared" to assist in some small way—even by home operation.

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A De Luxe Vacuum-Tube Voltmeter

Part I.—New Methods for Increasing Utility and Dependability

For some years past the vacuum-tube voltmeter has appeared to offer greatest promise in ever-demanding-to-be-improved voltage-measurement technique for d.c. as well as for a.c. up into the u.h.f. region. The use of vacuum tubes as coupling agents between frequency-sensitive or load-sensitive voltage sources and conventional power consuming meters seems to be the simplest means of preventing the power requirements of conventional indicating meters from deleteriously loading delicate circuits.

Reduced to its simplest expression, a vacuum-tube voltmeter is nothing more than a device applied to a direct current milliammeter (usually of D'Arsonval type) to raise the quite-low input resistance of the meter itself up into the multimegohm range in order that the whole meter shall affect the circuit behaviour as little as possible when applied to a source of voltage to be measured. In d.c. measurements it is obvious that the higher the voltmeter input resistance may be, the more desirable the instrument.

The same criterion of excellence applies in measurements of a.c. voltages, but here the problem additionally necessitates the insertion between source and meter of a rectifier to translate applied a.c. into d.c. to actuate the meter movement. The usual practice of employing a copper-oxide rectifier satisfies only the basic requirement of low frequency a.c. voltage measurement, for it limits undesirably both the input resistance and frequency range. It is to be noted that many commercial "vacuum-tube voltmeters" have been such only partially, since their designers resorted to the undesirable expedient of copper-oxide rectifiers for a.c. operation.

It is felt that an instrument deserving the name of vacuum-tube voltmeter should be "vacuum-tube" completely in all voltage measurements, a.c. as well as d.c., since the public automatically associates with the term the full merit of complete vacuum-tube operation for all measurements.

DESIGN PROBLEMS

The author begs indulgence for the preceding statement of facts, undoubtedly obvious to most readers, upon the ground that a definite and clear premise is essential to comprehension of any problem—and a problem he has most certainly found in the true vacuum-tube voltmeter. His own interest has stemmed from that experience, usual to serious investigators, of finding most available reasonably priced vacuum-tube voltmeters unsuitable for quantitative,

Over a period of some years the writer has built quite a few different designs of vacuum-tube voltmeters.

Each one was eventually pulled down and re-built into a so-called "improved design," with varying degrees of success. It was felt that the annoyances of grid, "gas" current, and non-linearity could be overcome, and eventually the writer read the article by McMurdo Silver in July 1945 "QST," entitled "Taming the Vacuum-Tube Voltmeter." This description of the failings inherent in the design of v.t.v.m.'s. and the eventual development of an instrument to overcome these failings made absorbing reading and ranks, to the writer's mind, as one of the best written technical articles to be seen in a radio journal.

It was resolved that when things became more normal after the war, and low tolerance resistances and ceramic switches became available, an instrument embodying the teachings of this article be built up. This has now been done, and it is felt that its operation is so far superior to previous vacuum-tube voltmeters, both home-built and commercial, of the writer's experience, that Amateurs and those whose profession is radio servicing would find the theory and constructional data of value, so presented herewith is the theoretical development of the design, which will be followed next month by a practical description of two instruments of different mechanical construction, but built to the same circuit.

It was necessary to change the diode types and also the values of the resistance range "stick" slightly to enable valves and resistances readily available in Australia to be used. However these modifications will be discussed at length in the second part of the article.

—J. Duncan, Technical Editor.

precision work. Faced with the need for a vacuum-tube voltmeter departing negligibly from the dependability and accuracy of the basic indicating meter itself, he found himself forced to continual compromise. So acute became the dissatisfaction developed over recent years in his direction of design, development and production of military projects, using any but the most expensive laboratory vacuum-tube voltmeters of decidedly limited utility, that he set himself to the task of simultaneously taming the v.t.v.m., reducing its cost and expanding its sphere of utility.

It is hoped that a brief review of some of the problems involved, the individual solutions and, finally, the combination of these individual solutions into an instrument of wide utility and extraordinary dependability will be of interest to prospective constructors.

As stated, the basic concept of the vacuum-tube voltmeter is the employment of a vacuum tube between the voltage to be measured and a suitable indicating meter. The triode possesses the advantage of being able to translate a change in grid voltage into a change in plate current; in other words it is a voltage-to-current transformer.

In idealised form, the grid resistance, or input resistance, may be made infinite so as to impose zero circuit loading, powerwise. In practice the grid should not be allowed to open-circuit during periods of non-connection to a conductive source, otherwise the meter may be damaged by excessive plate current. Thus it is desirable to close the grid-to-cathode circuit decisively with a grid resistor—of resistance as high as practicable—in order that such grid resistor itself shall not draw significant power from the source.

Although it illustrates nicely the basic principles involved, the meter circuit of Fig. 1 suffers from numerous drawbacks. Unless the grid is kept negative with respect to the cathode during operation, it will draw current and so load the source of voltage to be measured. The grid must be kept more negative than the highest voltage to be measured. This entails a high plate voltage if the tube is to operate as a Class A amplifier, desirably linear over any useful range of input voltages. The negative grid will prevent grid current, but the high plate voltage will result in what might be termed "gas" current, or "ion" current in the grid circuit when the resistance therein is high—even though the grid is negative. Add to this the unpleasant facts that there is no easy way of covering a multiplicity of widely different voltage ranges and that the calibration of the instrument is extraordinarily dependent upon filament and plate voltages as well as upon long-time changes in tube characteristics, and it becomes apparent that it is of little practical value. Investigation starting from the prior observations of others has revealed that these problems of the simple d.c. vacuum-tube voltmeter can be solved—whereupon more will promptly take their place. But let's take them as they come.

MULTIPLIER "STICK"

An almost unlimited range of full-scale voltage ranges may be obtained most economically by providing a tapped resistance "stick," or resistive input voltage divider, as shown in Fig. 2. This may consist of a multi-throw switch to move the grid down progressively from the top of the "stick" toward its bot-

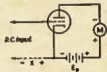


Fig. 1.
Basic vacuum-tube
voltmeter circuit.

tom, the total resistance of the "stick" shunting the source and representing the practical value of meter-input resistance, while the position of the grid tap determines the voltage range in use. Because of inescapable capacitances associated with the (desirably non-inductive) resistors making up the "stick," it will be useless in a.c. measurements without inconvenient capacitive compensation for each step. But there is no need to worry about this yet.

The use of this input resistor "stick" allows a great enough number of ranges to make the d.c. vacuum-tube voltmeter quite universal in application, if its initial sensitivity be adequate for the lowest voltage range desired. It will simplify the design of the circuit, since all that is required basically is a single low-range v.t. voltmeter, the variable input "stick" serving to give this single-range meter as many voltage ranges as may be desired.

What of the resistance of this "stick"? Its total resistance must be high if it is not to load high-impedance circuits to the point where the accuracy of measurement becomes seriously affected. Fifty megohms seems a desirable total "stick" resistance. This will constitute the vacuum-tube voltmeter's input resistance if all other problems are suitably solved. Fig. 2 gives actual resistance values for such a 50-megohm "stick" with six taps distributed down it to give voltage ranges of 3, 12, 30, 120, 300 and 1,200 volts. (Actually, the v.t.v.m. which follows the tap "sees" 0 to 3 volts total for each of these ranges.)

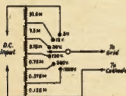


Fig. 2.—Voltage divider or "stick" for obtaining multiple voltage ranges. All resistors are of $\frac{1}{2}$ -watt rating. Each should consist of two lower-resistance units in series matched to an accuracy of plus or minus one per cent.

ELIMINATING GRID AND "GAS" CURRENTS

What about grid or "gas" current when the grid tap is moved from 125,000 ohms progressively upward in increasing large resistance steps to a total of 50 megohms? The designer and the user can deceive himself by saying, "zero-set the meter with the input terminals short-circuited." That is too simple—and seemingly a too-popular misconception of the proper solution. Its effect is to short-circuit the input grid resistor in order to set electrical meter zero before operation, ignoring the effects of "gas" current which causes a significant initial meter reading when the input terminals are opened and "gas" current appears.

If the voltage source to be measured is of low resistance, such as a power supply or battery, this will be permissible in practice since "gas" or grid-current effects once more will disappear when this low-resistance source is connected between grid and cathode. They will not disappear, however, when the source resistance is high, as in amplifier grid-voltage measurements.

An instrument requiring that its input terminals be temporarily short-circuited in order to set meter zero initially therefore will render invalid any low-voltage measurements across high-resistance circuits.

So we are back at one of the besetting sins of most vacuum-tube voltmeters to date.

To eliminate grid current the v.t.v.m. grid must be kept definitely negative with respect to its cathode for all orders of input voltage to be measured. But this does nothing for "gas" current (often mistaken for tube-base leakage, grid current, or almost anything but what it really is). Gas current is a function of the plate voltage applied to a vacuum tube. It does not show up noticeably in ordinary applications until the grid resistance is made very high—of the order of megohms. But, a 50-megohm input resistance is necessary if the v.t.v.m. is not to impair seriously the accuracy of voltage reading taken when it is shunting the high value of grid resistance often found in resistance-coupled amplifier circuits which must be tested by a universal meter.

INDICATOR SENSITIVITY

The solution is to apply to the tube of the v.t.v.m. a plate voltage so low that "gas" current cannot occur to any effective degree. This plate voltage will be around 20 volts, preferably less. With such a low value of plate voltage and with the grid negative enough never to allow the maximum-value input voltage to be measured to drive the grid positive, examination of tube characteristics indicates that there will be mighty little plate current to actuate the indicating meter. A 50 or 100 microampere meter is a costly thing at best, and unduly sensitive to mechanical abuse—of which any universal meter will receive plenty in service. It is highly desirable to use a basic meter movement of 0-1 milliamperes sensitivity because it is more easily obtained, is more rugged, and imposes a less exorbitant cost premium on the final instrument than a more sensitive meter.

One approach to this particular problem is to use a high-plate-current power pentode operated at low E_p in place of the simple triode. This is workable, but since it is going to be necessary to use two tubes eventually, it is not an ideal solution because it is inevitable that separate tubes, not manufactured identically, will age in a dissimilar manner. The tube manufacturers state that the maintenance of uniformity of sections of dual triodes is greater over a period of time than that of separate tubes. Thus, a dual triode is indicated. Additionally, the fewer and the smaller the elements

in the selected tube the better, since the possibility of "gas" current developing over time, even at the ridiculously low plate voltage necessary to eliminate it to start with, is minimized by reducing the amount of metal in the tube's evacuated envelope.

At this point the ubiquitous cathode follower is brought in. A definite and constant order of "gas" current in the v.t. voltmeter tube can be tolerated if it does not vary, as it would were the input grid resistance to be changed in the course of changing ranges. The cathode follower permits the satisfaction of this requirement and, at the same time, permits the use of a following meter-actuating tube "seeing" a constant grid resistance. The cathode follower may follow immediately the 50-megohm input voltage-divider "stick" of Fig. 2.

When operated at about 17 volts on its plate, none of the usual and unpleasant errors in meter reading arising from "gas" current will be introduced and since its grid automatically is negative, by virtue of the large and heavily degenerative cathode resistor, R_1 , of Fig. 3, there is no cause for worry about grid current. However, at this low plate voltage, there is insufficient plate-current change to operate a 1 Ma. meter movement directly, exactly as mentioned previously. Also, the circuit will have the nature of a rectifier in the sense that, for a negative voltage applied to the grid, the plate current cannot decrease by the same amount it will increase for an equal positive voltage applied to the grid of the tube.

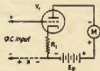


Fig. 3.—Cathode follower coupling stage. The voltage drop across R_1 is partially bucked out by a fixed voltage at X to provide Class A operating bias.

If any claim to general usefulness is to be made for the instrument, it is necessary substantially to prevent changes in the tube itself with ageing from affecting its operation. This can be done by making the cathode resistor, R_1 of Fig. 3, very large. A suitable value is 5 megohms which, with 17 volts on the tube's plate, means almost no plate current at all. Sufficient cathode resistance should be used to degenerate the tube gain to a point where age and other factors affect operation practically not at all.

Any departure from Class A operation, with its associated linearity, which is required in the final instrument, cannot be tolerated. So the voltage drop across R_1 is determined and a potential sufficient to shift the actual operating grid bias up to a value suitable for Class R operation and linearity is placed in series with the grid only, as at X in Fig. 3. Having previously assumed a 3-volt basic range for the v.t. voltmeter proper, the grid may be set at about 4

volts negative with respect to its cathode. If this is done the operation of the tube will be found to be linear over a suitable input-voltage range in both directions; i.e., with the grid run 3 volts positive or 3 volts negative. This total 6-volt range is required so that the polarity may be reversed by a suitable switch at the meter itself for reading either negative or positive voltages within the range of the final instrument without the need for reversing input connections.

METER AMPLIFIER

All of this looks like something promising so far as it goes—a 50-megohm input resistance, enough taps thereon to give all the d.c. voltage ranges reasonably required in the six steps possible with a conventional range switch, freedom from grid current and, most important, absence of "gas" current effects to a point where the usual short-circuiting of input terminals to set an initial meter zero can be eliminated. Zero is set simply, with the input open or shorted, accompanied by a pleasing order of stability, all thanks to the cathode follower operated at very low plate voltage.

The voltage appearing across R1 of Fig. 3 will be a fixed d.c. voltage resulting from plate-current flow through V1, upon which will be super-imposed a d.c. voltage varying almost as does the applied grid input voltage. This variation may be used to actuate a second tube which, in turn, actuates the 0-1 Ma. meter movement. The initial fixed positive voltage across R1 can be washed out by another device later on, so let us ignore it for the moment.

The grid and cathode of the second, or meter-actuating triode will be connected across R1. This tube must be operated at a sufficiently high plate voltage so that a 3-volt change at its grid will cause a 1 Ma. change in its plate current, plus something to spare to allow for variations in individual tubes when first setting up voltage calibration and ranges. In Fig. 4 is depicted the cathode follower at V1, exactly as described above, with the meter-actuating tube at V2. With R1 established at 5 megohms, the excessive negative bias which the voltage drop across R1 would place on the grid of V1 is offset by means of the positive bucking bias provided by the potential B1 and connections are made so as to apply a replica of the varying input voltage appearing across R1 to the grid of V2. But again, ageing of V2 should not affect too significantly the operation of this now-beginning-to-develop instrument.

To obtain a 1 Ma. current change in the plate circuit of V2, for a 3-volt

input to V1, V2 must be operated at some more normal plate voltage than in the case of V1. This spells an initial order of "gas" current in V2 as a result of the 5-megohm cathode resistor of V1 appearing in the grid circuit of V2. Actually, there is no need to worry at all about this, for the value of R1 never is changed in operation and therefore whatever "gas" current V2 exhibits will be constant for all practical purposes; its operational effect can be washed out by the zero-set adjustment which will be provided later.

To divorce the variability of V2 with time, etc., from the situation, cathode degeneration may be employed once again, this time by means of R2. If R2 be about 40 kilohms and the plate potential B4 about 200 volts, everything will be satisfactory. But once again excessive negative bias must be bucked out, this time upon the grid of V2, exactly as was done for V1 by potential B1. This may be done by obtaining some bucking bias for V2 from the fixed voltage drop across R1, already in the grid circuit of V2, and by supplementing this bucking bias with a suitable potential at B3.

SUPPLY VOLTAGE COMPENSATION

By following properly all of the preceding steps, a portion of the skeleton of a d.c. vacuum-tube voltmeter, free from "gas" and grid current effects in their usual ruinous form, has been derived, and simultaneously long-time changes in tube characteristics have been prevented quite effectively from influencing final results, except as they may be compensated for by a meter zero-set not as yet provided. But what of variations in plate and heater voltage? The plate voltage may be regulated at some small expense, but the same does not hold for economical regulation of heater voltage and cathode emission, although power-line operation (with its invariably fluctuating line voltage) certainly is desirable.

When the circuit of Fig. 4 is converted into what looks like a push-pull circuit, significant and sizable gains in stability versus short-time variation in power-line voltage are obtained. The actuality is depicted in Fig. 5. Here V1a and V1b have been added to balance V1 and R1, as have V2a and R2a to balance V2 and R2. If a 6SN7GT dual triode is selected for V1 and V1a, and another 6SN7GT tube for V2 and V2a, a condition is obtained where, assuming only commercially-acceptable tubes in each position, the whole circuit is balanced nicely against supply-voltage variations. Simply stated, whatever change occurs in the V1-V2 branch of the circuit occurs in substantially equal degree, but in opposite polarity, in the circuit branch containing V1a and V2a. With this arrangement variations in supply voltages, plate, grid and heater, of 10% cause a change in meter reading of only approximately 1%.

ZERO ADJUSTMENT

By connecting the 0-1 Ma. meter from cathode to cathode between V2 and V2a, the adjustable resistor, R3, can be inserted conveniently in series therewith, providing a means for setting the volt-

age range; i.e., R3 is adjusted so that a 3-volt input will give full-scale deflection at M. If R3 is made about 3 kilohms, this may be done nicely for almost all commercially encountered 6SN7GT tubes which may be used at V2 and V2a, but first the meter zero must be adjusted electrically by balancing the cathode currents of V2, and V2a. Here a 3-kilohm potentiometer, R4, in the plate circuits of V2 and V2a serves with complete satisfaction. Coincidentally it is found that with 1,200 volts applied to the 3-volt range, the meter is provided with practically 100% protection against overload burn-out!

Since V1, V1a, V2 and V2a are operated linearly as Class A amplifiers, investigation of the meter "slope" or deflection vs. applied d.c. voltage, pleasingly reveals that equal increments in input voltage produce equal increments in meter deflection, and that a linear d.c. voltmeter with equal spacing between meter-scale graduations is obtained with this arrangement.

Adding resistor R12 in series with the grid of V1 and C6 in shunt to ground provides a filter which operates to wash out any effects of a.c. which simultaneously may be superimposed upon the d.c. voltage which is to be measured.

PRACTICAL CIRCUIT

Since all of the problems of a 50-megohm input resistance d.c. vacuum-tube voltmeter have been nicely solved, these accomplishments may be translated into a practical constructible circuit. This is done in Fig. 6, in which all previously referenced parts correspond to those of the preceding diagrams. Included are the input voltage divider range-selector "stick" of Fig. 2, at the left, supplemented by R9, a 75-megohm resistor with which any of the six voltage ranges may be multiplied by a factor of 2.5. Thus are realized the six original voltage ranges of 3, 12, 30, 120, 300 and 1200 volts full-scale, all at 50 megohms input resistance, plus six additional ranges (when the input is connected across the terminals marked "3000 v." and "Com.") of 7.5, 30, 75, 300, 750 and 3,000 volts.

These new and added ranges* all are at the seemingly astronomical input resistance (for a stable instrument) of 125 megohms as "seen" by the source to be measured! Yet all positions are equally stable, equally "cool," with no

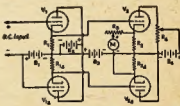


Fig. 5.—This is the circuit of Fig. 4 with the tubes, V1a and V2a added to provide a balanced circuit.

* Not included on basic range selector switch for reasons of complexity and necessary high voltage insulation.

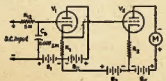


Fig. 4.—Cathode follower and meter-actuating circuits. B1 and B3 are bucking voltages.



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change in meter zero regardless of whether the input terminals are open or short-circuited or ranges switched—quite a contrast to the conditions under which the design started.

Batteries B1, B2, B3 and B4 have been replaced by the voltage-dropping resistors R5, R6, R7 and R8, all connected across the output of the a.c. power supply made up of the rectifier tube, V3, filter capacitors C1 and C2, the small power transformer, T, and the "on-off" switch, S1. By adding the d.p.d.t. switch, S2, the circuit may be arranged to reverse the meter polarity, and thus input polarity, so that positive or negative voltages of anywhere from 0.05 through 3000 volts may be read without reversing input connections—simply by rotating two switch knobs.

CURRENT AND RESISTANCE MEASUREMENTS

At last possessed of a thoroughly practicable, stable and dependable d.c. vacuum-tube voltmeter, truly "vacuum-tube" in its functioning, all that need be done now is to make it function as an ohmmeter, as an a.c. and r.f. voltmeter, db. meter and milliammeter. But the path of the original investigator is easy only when reduced to ultimate written description! Taking the easy ones first, milliammeter ranges may be provided by switching suitable shunts across the basic meter, M, by means of an added section on the range switch, this switch and shunts being selected by adding two contacts to what now may be termed the "function" switch, S2, and bringing meter and selectable shunts out to suitable input terminals. This is so conventional as to be worthy of little notice, except to select practically useful current ranges just as was done in choosing the voltage ranges—ranges which will permit the most generally made measurements to be read well up on the meter scale where the basic milliammeter is of greatest accuracy.

Fig. 7 shows fundamentally how resistances from 0.2 ohms up through 2000 megohms may be measured, again in six ranges so proportioned that the most frequent measurements will fall upon "open" portions of the meter scale which, by necessity, is substantially logarithmic and therefore "crowded" at high readings. The six-position switch of Fig. 7, may be yet another switch section added to the basic range switch, brought into circuit by suitable switching added to the v.t.v.m. of Fig. 6.

The whole principle involved is so simple as to deserve no more than passing mention, except to state that the resistance of an unknown resistor, R_x , is measured, not in the usual terms of the current through it, but in terms of the voltage across it. This gives a right-reading ohmmeter scale in sharp and pleasing contrast to the backward-reading ohmmeter scales of more conventional service instruments.

By virtue of having switched out the voltage-range "stick" for ohmmeter operation, the v.t.v.m. of Fig. 6 "looks" like an infinite resistance to the ohmmeter circuit. This helps in measurements of resistances up to 2000 megohms using only a 3-volt dry battery. Unfortunately it is not easy to eliminate this battery for resistance measurements in favor of drawing an equivalent voltage from the v.t.v.m. power supply. This is because the voltage regulation of the ohmmeter voltage supply must be exceptionally good. The v.t.v.m. power supply has poor regulation to save space and weight, since good regulation is not necessary to the v.t.v.m. power supply, regulation in the instrument as a whole being automatic by virtue of its balanced-circuit design.

It might be added that two 1½-volt standard "A" cells, procurable rather cheaply, work out more economically than would the cost of parts needed to eliminate them. Their life is indefinitely long unless they are used consistently to measure resistance of less than 100 ohms—a condition seldom encountered frequently in radio design or servicing in any case.

A.C.-K.F. OPERATION

At first glance all that is necessary for a.c. voltage measurement (and this should mean r.f. up into the u.h.f. region if the instrument is to be worthy of its name) should be to connect a suitable rectifier between the source of voltage to be measured and the d.c. vacuum-tube voltmeter of Fig. 6. It is regrettable that life is not that simple.

The presumed simplest form of a.c.-to-d.c. rectifier is a two-element diode vacuum tube. This type of rectifier has been employed in the best instruments heretofore available, but it is not ideal. To begin with, the d.c. output vs. a.c. input curve is not linear over the desired low-voltage range of 0-3 volts. Additionally, a diode draws some power from the circuit to which it is applied, power drawn to keep its input capacitor

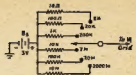


Fig. 7.—Circuit added for resistance measurements.

charged (from which is drawn the steady d.c. voltage to actuate the following d.c. meter). True, this power is very small, and suitable proportioning of the diode circuits can result in an effective input resistance which is desirably high.

Knowing of the excellent linearity of the so-called "infinite-impedance" detector possessed of potentially-infinite input resistance, one is inclined to turn to it—exactly as the author did in an early design. Depicted in Fig. 8, it appears off-hand to be an ideal solution to the problem of an a.c. rectifier for a v.t.v.m. Appearances can be deceiving, however. Theoretically it might be supposed that the capacitor, C3, shunting the large (and therefore degenerative) resistor, R9, would charge up to the peak value of the a.c. input voltage to be measured, and that if the values of C3 and R9 were large enough, this charge would be held substantially until the next input charging cycle. Unfortunately, effects occur upon which the author prefers to express no positive views.



Fig. 8.—Infinite-impedance detector circuit which was tried as a rectifier for a.c. measurements.

The d.c. output voltage does not appear to approximate the 1.41 times the value of sine-wave a.c. input which might be anticipated. This is inconvenient but not ruinous. On the other hand, anticipated linearity, with consequent identicalness of slope between successive voltage ranges for such a rectifier, has been found disappointing. Add to this the fact that the maximum input voltage which may be handled must be significantly less than the available plate supply voltage and what appeared at first glance to be a very nice solution turns out otherwise. (It is not possible to put a voltage-divider "stick" ahead of the a.c. rectifier with particularly happy results.)

DIODE RECTIFIER

Fig. 9 shows a diode rectifier circuit in which C4 insulates the rectifier from d.c., so that a.c. superimposed upon d.c., as in a vacuum-tube plate circuit, may be separated and measured independently. On the positive cycle of the applied a.c. voltage, the diode, V4, passes current, thus charging C4. On the negative half of the cycle, V4 is non-conduct-

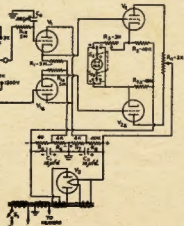


Fig. 6.—Practical vacuum-tube voltmeter circuit with values. Symbols correspond to equivalent units in preceding diagrams.

ing, and C4 discharges slowly through R10 and R11—slowly because of the high value of R10 and R11 and the effectively high value of C4 with respect to the frequency of the applied a.c. voltage. Here a problem is encountered—the value of C4 suitable for 20 cycles necessitates a type of capacitor construction seldom satisfactory in terms of losses and inductance at 100 megacycles, for example.

In the instrument to be described in Part II. of this article, this disadvantage is circumvented by building V4 into a removable probe which contains a value of C4 suitable for middle audio frequencies on up to over 100 megacycles; also built into the instrument is a much larger duplicate of C4, such as is suitable for low-frequency operation, and an arrangement is provided so that this large C4 is brought into the circuit only when the probe is plugged into its receptacle in the instrument.

Low frequency measurements are made by means of the d.c. probe cords. For all r.f. (and high a.f.) work the probe is withdrawn, to be contacted directly to the circuit carrying the voltage to be measured without any intervening leads to introduce serious, if not ruinous, errors.

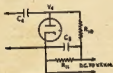


Fig. 9.—Diode rectifier circuit for a.c. measurements.

Since it has appeared that making R10 and R11 large operates to minimise the effects of variation in the internal resistance of individual diodes, R10 conveniently may be made 20 megohms. R11 then may be the 50-megohm d.c. range "stick" of Fig. 2 and Fig. 6. C5 is an a.c. filter capacitor intended to complete the a.c. load circuit of the diode V4 and to aid in removing a.c. from the d.c. v.t.v.m. proper. Making R10 20 megohms serves another useful purpose in addition to making the a.c. diode load resistance high. To the 50-megohm resistance, R11, the resistance R10 bears the relation of 1:4:1, the same relation existing substantially between the peak voltage output of the a.c. rectifier (1.41 r.m.s. sine-wave a.c. input, approximately) and the r.m.s. a.c. input.

Theoretically it should be possible to connect the output of the rectifier of Fig. 9 to the input of the d.c. v.t.v.m. of Fig. 6 and read a.c. voltages directly upon the d.c. meter scale of the latter. This is a sound assumption only in part. The non-linearity of the diode rectifier will necessitate a new meter scale for the 3-volt range, although the diode will become sufficiently linear to permit doing just this on the higher-voltage ranges. The d.c. recovery vs. a.c. input characteristic of the diode will not work out precisely as expected, so that the d.c. output may not remain in consistent step for successive ranges. This can be compensated for quite nicely by using, not one range-set adjustment,

such as R3 of Fig. 5 and Fig. 6 for all d.c. ranges, but by arranging additional switching to select different values of a.c. range-set resistors as required.

In practice this will work out to about four a.c. range-set resistors for six ranges—one for 3 volts, one for 12 volts, one for 30 volts, and one for 120, 300 and 1200 volts. This is not a serious problem physically, but is somewhat annoying when translated mainly into the behaviour-complexity of the seemingly simple circuit of Fig. 9.

REMOVING CONTACT POTENTIAL

Thus far no mention has been made of contact potential generated within the diode in the absence of any applied voltage (except heater). Suffice it to say that, using a 9006 u.h.f. diode for V4, the 70-megohm d.c. load will result in the appearance across R11 of about 1.0 volt in the absence of any input voltage whatsoever. This must be eliminated if it is not to cause false meter readings on those voltage ranges low enough for 1.0 volt to represent a significant error—below 300 volts, for example. So again a balancing tube similar to V1a and V2a is added—in this case V4a of Fig. 10. With four resistors in its own "stick" totalling 10 megohms, V4a will produce contact potential equal to or greater than that developed by V4 across the 50-megohm range-selector "stick," or it can easily be made to do so by interchanging any pair of 9006 tubes so far encountered.

On a.c., R13 is adjusted initially for meter zero, then left alone. This equal and opposite contact potential is applied to the balance cathode follower V1a, through a suitable switch. This switch, shown in Fig. 10, selects a portion of the contact potential developed across the four resistors in series comprising the load of V4a in step with that selected from V4 by manipulation of the range-selector switch controlling the 50-megohm voltage-multiplier "stick" of Fig. 2 and Fig. 6 so as to keep contact potential nicely balanced out for the 3, 12, 30 and 120-volt a.c. ranges of the instrument. The error introduced in the 300 and 1200 volt ranges from this source is so small it is neglected, since it is only on the order of eight one-hundredths to three tenths of one per cent.

What is the effective a.c. input resistance of such a rectifier? This is questionable for, while diodes are very simple looking devices, their behaviour seems to belie their seeming simplicity. A conventional method of stating the a.c. input resistance might be to say that it is represented by the actual load resistance shunted by the diode-probe capacitance. This is believed to convey a questionable picture and one not directly meaningful in practice. It seems better, after considerable cogitation, to state that the effective loading upon a circuit to which this particular diode network is applied will look like $r + \frac{1}{\omega C}$ shunted by the diode-probe capacitance, where r is the diode load resistance.

Thus it seems conservative to say that the rectifier of Fig. 9 and Fig. 10 will be "seen" by a voltage source to be

measured as 6.6 megohms shunted by 8 uF. A little calculation will show that this represents, commercially at least, an unusually high order of v.t.v.m. input resistance in a.c. operation. This resistance will diminish as the frequency is increased, but the same thing applies to the practically attainable impedances of tuned circuits across which voltages are to be measured in most cases as the frequency is made higher.

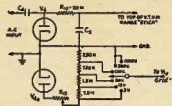


Fig. 10.—Balancing tube, V4a, added to balance out "contact" potential.

SUMMARY

It is believed that several new and novel features have been described. Specifically these are: the insertion of a low-E, cathode follower and duplicating balancing tube between a simple two-tube balanced d.c. vacuum-tube voltmeter and an input range-multiplier network in order to eliminate the deleterious effects of grid and "gas" currents as a result of changing input resistance; the automatic plug-in substitution of different values of a.c. diode-input capacitance in order efficiently to cover a wide frequency range in one instrument; the provision of a variable source of balancing contact potential which may be kept in step with that resulting from a diode preceding a selective resistive voltage-dividing network. It is hoped that these small contributions to the art of v.t.v.m. design may be of interest.

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QUESTIONS AND ANSWERS

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2. Q.—Can anyone tell me where this new term **electron volts** comes from and how these **electron volts** differ from the good old fashion variety?

A.—This is just one of many instances in which scientists have taken a perfectly innocent word or words, given them a specialised meaning for their own use, and then were quite surprised that the general public wondered what on earth they were talking about.

An **electron volt** is not a unit of voltage like microvolt, millivolt, kilovolt, etc., but a measure of energy. Suppose we think about a cathode ray tube. Electrons are accelerated away from the cathode by the h.t. of say 1,500 volts. When the electrons have been accelerated and are moving down the tube at a constant speed, they each possess a certain amount of energy due to the fact they are moving. (When they hit the fluorescent screen part of this energy appears as light and the rest as heat.)

The energy each electron has is said to be 1,500 **electron volts**. Likewise 1 **electron volt** is the energy an electron has if it is accelerated by a potential of 1 volt. This is a very small amount of energy.

Just to see how small it is, let's compare it with the measure of energy most are familiar with, the kilowatt hour. As a simple case, think of a diode which has 1 volt across it and this causes a current of 1 amp. Then the power it draws is 1 watt, so in 1,000 hours it will use 1 Kwh. which will cost you about two pence. Now each electron which flows has an energy of 1 **electron volt** (which is turned into heat when it hits the plate.) And in the current of 1 amp. there are 600,000,000,000,000,000,000 electrons per second, each with 1 **electron volt** of energy. So if you multiply this rather large number by the number of seconds in 1,000 hours, the answer is the number of **electron volts** of energy which equals a kilowatt hour. So an e.v. is not much energy.—A.K.H.

P.S.—Considering the first sentence I wrote, I suppose I should remark that where I've used the words power and energy, they have their scientific meaning.

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The list below shows first the Country, the Zone number in parenthesis (as used by the "CQ" W.A.Z. Award) and the Amateur Prefix.

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Austria (15)	(MB9) OE
Azores Islands (14)	CT2
Bahama Islands (8)	VP7
Bahrain Island (21)	MP4
Baker, Howland & Am. Phoenix Islands (31)	KB6
Balearic Islands (14)	EA8
Barbados (8)	VP6
Basutoland (38)	ZS9
Bechuanaland (38)	ZS9
Belgian Congo (36)	ON
Belgium (14)	ON
Bermuda Islands (5)	VP9
Bhutan (22)	
Bolivia (10)	CP
Bonin and Volcano Islands (Two Jima) (27)	KG4
Borneo, British North (28)	VS4
Borneo, Netherlands (28)	PK3
Brazil (11)	PY
Brunei (28)	VS5
Bugaria (20)	LZ
Burma (28)	XZ
Cameroons, French (36)	FE
Canada (2, 8, 4, 5)	VE
Canal Zone (7)	KZ5
Canary Islands (33)	EA8
Cape Verde Islands (35)	CR4
Caroline Islands (27)	KG6
Cayman Islands (8)	VP6
Celebes & Molucca Is. (28)	PK8
Ceylon (22)	VS7
Chagos Islands (39)	VQ8
Channel Islands (14)	GC
Chile (12)	CE
China (23, 24)	(B)
Christmas Island (29)	ZC3
Clipperton Island (7)	
Cocos Island (7)	TI
Cocos Islands (29)	ZC2
Colombia (9)	HK
Comoro Islands (39)	
Cook Islands (32)	ZK1
Corsica (15)	(F)
Costa Rica (7)	TI
Crete (20)	SV
Cuba (8)	CM, CO
Cyprus (20)	(MD7) ZC4
Czechoslovakia (15)	OK

Denmark (14)	OZ
Dodecanese Islands (Rhodes) (20)	SV5
Dominican Republic (8)	HI
Easter Island (12)	
Ecuador (10)	HC
Egypt (34)	(MD5) SU
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Guinea, Portuguese (35)	CR5
Guinea, Spanish (35)	
Haiti (8)	HH
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Heard Island (39)	VK1
Honduras (7)	HR
Honduras, British (7)	VP1
Hong Kong (24)	VS6
Hungary (15)	HA
Iceland (40)	TF
Ili (33)	
India (22)	EP, EQ
Iran (21)	(MD6) YI
Iraq (21)	GI
Ireland, Northern (14)	GB
Isle of Man (14)	IM
Israel (20)	4X4
Italy (15)	I
Jamaica (8)	VP5
Jan Mayen Island (40)	
Japan (25)	JA
Jarvis & Palmyra Is. (31)	KP6
Java (28)	PK
Johnston Island (31)	KJ6
Kenya (37)	VQ4
Kerguelon Islands (39)	
Korea (25)	HL
Kuwait (21)	(VT1)
Laccadive Islands (22)	VU4
Lebanon (20)	AR8
Leeward Islands (8)	VP2
Liberia (35)	EL

Libya (34)	(MC1, MD1, MD2, MT2)
Liechtenstein (15)	HE1
Luxembourg (14)	LX
Macau (24)	CR9
Macquarie Island (30)	VK1
Madagascar (39)	FB
Madagascar Islands (33)	CT3
Malaya (28)	VS1, 2
Maldives Islands (22)	VSE
Malta (15)	ZB1
Manchuria (24)	C9
Marianas Is. (Guam) (27)	KG6
Marion Is. (and Prince Edward Is.) (39)	ZS2
Marshall Islands (31)	KX8
Martinique (8)	FM
Mauritius (39)	VQ8
Mexico (8)	XE
Midway Island (31)	KM6
Miquelon & St. Pierre Is. (5)	FP
Monaco (14)	(CZ)
Mongolian Rep. (Outer) (23)	(JT)
Morocco, French (33)	CN
Morocco, Spanish (33)	EA9
Mozambique (37)	CR7
Nepal (22)	VU7
Netherlands (14)	PA
Netherlands West Indies (9)	PJ
New Caledonia (32)	FK
New Guinea, Netherlands (28)	PK7
New Guinea, Territory of (28)	VK9
New Hebrides (32)	FU, TJ
New Zealand (32)	ZL
Nicaragua (7)	YN
Nigeria (35, 36)	YD
Niue (32)	ZK2
Norfolk Island (32)	VK9
Norway (14)	LA
Nyassaland (37)	ZD8
Oman, Trucial (21)	MP4
Pakistan (22)	AP
Palau (Pelew) Islands (27)	KC6
Palestine, Arab (20)	ZC8
Panama (7)	HP
Papua Territory (28)	VK9
Paraguay (11)	ZP
Peru (10)	OA
Philippine Islands (27)	DU
Phoenix Is., British (31)	
Pitcairn Island (32)	VR8
Poland (15)	SP
Portugal (14)	CT1
Principe & Sao Thome Is. (36)	
Puerto Rico (8)	KP4
Reunion Island (39)	FR
Rhodesia, Northern (36)	VQ2
Rhodesia, Southern (38)	ZE
Rio de Oro (33)	(EA8)
Roumania (20)	YC
Ryukyu Is. (Okinawa) (26)	KR6
St. Helena (36)	ZD7
Salvador (7)	YS
Samoa, American (32)	KS6
Samoa, Western (32)	ZM
San Marino (15)	(M1)
Sarawak (28)	VSE
Sardinia (15)	VI
Saudi Arabia (Hedjaz & Nejd) (21)	HF
Scotland (14)	GM
Seichelles (39)	VQ6
Siam (28)	HS
Sierra Leone (35)	ZD1

W.I.A. 1950 National Field Day

GENERAL RULES

Sikkim (22)	ACS
Solomon Islands (28)	VR4
Somaliand, British (37)	(MD4), VQ6
Somaliand, French (37)	(MD4), FL
Somaliand, Italian (37)	(MS4, MD4)
South Georgia (13)	VP8
South Orkney Islands (13)	VP8
South Sandwich Islands (13)	VP8
South Shetland Islands (13)	VP8
Southwest Africa (38)	ZS3
Soviet Union	
European R.F.S.R. (16)	UA
Asiatic R.F.S.R. (17, 18, 19)	UA0
Ukraine (16)	UB5
Belorussian S.S.R. (16)	UC2
Azerbaijan (21)	UD6
Georgia (21)	UF6
Armenia (21)	UG6
Turkoman (17)	UH8
Uzbek (17)	UI8
Tadzhik (17)	UJ8
Kazakh (17)	UL7
Kirghiz (17)	UM8
Karelo-Finnish Republic (16)	UN1
Moldavia (16)	UO5
Lithuania (15)	UP2
Latvia (15)	UQ2
Estonia (15)	UR2
Spain (14)	EA
Sumatra (28)	PK4
Svalbard (Spitzbergen) (40)	(LA)
Swan Island (8)	KS4
Swaziland (38)	ZS7
Sweden (14)	SM
Switzerland (14)	HB
Syria (20)	YK
Tanganyika Territory (37)	VQ3
Tangier Zone (33)	EK
Tannu Tuva (23)	(TT)
Tibet (23)	AC4
Timor, Portuguese (28)	CR10
Togoland, French (35)	FD
Tokelau (Union) Islands (31)	
Tonga (Friendly) Islands (32)	VR5
Transjordan (20)	ZC1
Trieste (15)	AG2, MF2
Trinidad and Tobago (9)	VP4
Tristan da Cunha & Gough Is. (38)	ZD9
Tunisia (33)	(3V8) FT
Turkey (20)	TA
Turks & Caicos Islands (8)	VP5
Uganda (37)	VQ5
Union of South Africa (38)	ZS
United States of America (3, 4, 5)	K, W
Uruguay (13)	CX
Vatican City State (15)	HV
Venezuela (9)	ZV
Virgin Islands (8)	KV4
Wake Island (31)	KW6
Wales (14)	GW
Windward Islands (8, 9)	VP2
Wrangel Island (19)	
Yemen (21)	
Yugoslavia (15)	YU
Zanzibar (37)	VQ1

1. The Wireless Institute of Australia's National Field Day Contest will be held over the weekend of 18th and 19th January, 1950, and will commence at 1500 hours K.A.S.T., Saturday 18th, and continue through until Sunday the 19th at 1800 hours.

2. The Contest is limited to portable stations operating within the Commonwealth and its mandated territories.

3. A portable station, for the purposes of the Field Day, is defined as one whose power is not obtained from either private or public mains, shall not be located closer than 5 miles to the home location of the operators, and shall not be situated in any occupied dwelling.

4. No apparatus is to be set up or erected on the size of the portable station smaller than 6 (six) hours prior to the commencement of the contest. A station may be moved from one site to another within the same State during the period of the Contest.

5. More than one operator may be used in the operation of the portable station, provided that all operators are licensed Amateurs.

6. Operation may be on any of the recognized Amateur bands, and more than one transmitter may be used, providing only one transmitter is used at any one time.

7. When calling, c.w. stations will use "QO FD," and phone stations will use "QO Field Day," to indicate they are portable stations. Attention is directed to the requirements for portable stations in the F.M.G.'s Handbook.

8. SECTIONS.—The Contest is divided into three sections, namely, Open, C.W., and Phone. The Open Section shall consist of both phones and c.w. operation. Participants may enter for all Sections, provided a separate log is entered for each case.

9. LOGS.—Logs must be forwarded through the Division to reach Federal Executive not later than 31st February, 1950, and decisions of Federal Executive in all matters relating to the Contest will be final.

10. The operator(s) will choose the most suitable 24 hours of operation from the total operating time of 24 hours and submit this 24 hour period as their log for the Field Day. Any lesser period than 24 hours may be operated.

11. Logs must show the location of the portable, name and call signs of the operator in the party, a description of the transmitter(s), receiver(s), antenna(s) and the power supplies. The power input to the final stage with the antenna connected (which must not exceed 35 watts) will also be shown.

12. Log entries are to be in the following order: Date, time (K.A.S.T.), station used, Amateur band used, report sent, report received, contacts points claimed, bonus points claimed, QO Field station worked, and portable operation class. A summary at the conclusion of the log will facilitate checking.

13. The completed log must be signed by each of the operators with a statement that the F.M.G. Regulations and the Rules of the Contest have been observed.

14. SCORING.—For the purposes of the Field Day, the following constitute separate VE districts: VK8, VK8, VK4, VK5 (South Australia), VK5 (Northern Territory), VK6, VK7, and VK9.

15. A complete exchange of report and QTH is necessary before any points may be claimed.

16. Points will be awarded as follows:—

- (a) For contacts with a fixed station within the Commonwealth (Rule 14), outside the competitor's State 1 pt.
- (b) For contacts with other portable stations in the Contest within the same State 2 pts.
- (c) For contacts with stations in Asia, North America, and Oceania (outside the Commonwealth, Rule 14) 3 pts.
- (d) For contacts with stations in Europe 5 pts.
- (e) For contacts with stations in Africa and South America 7 pts.
- (f) For contacts with other portable stations in the contest outside the State . . . 10 pts.
- (g) A bonus for each Continent worked on each band. For Oceania, the contact must be outside the Commonwealth, Rule 14, add to the final score . . . 25 pts.
- (h) A special bonus for each Interstate or overseas contact, on or above, 50 Mc., add to the final score 50 pts.

17. AWARDS.—An attractive certificate will be awarded to the outright winners in each Section, namely, Open, C.W. and Phone. Certificates will also be awarded to the winner in each State in each section. Further certificates will be awarded at the discretion of Federal Executive. The outright winners are not eligible for the State awards.

18. Certificates will be awarded to each operator of the winning stations, provided each operator has contacted at least 26 per cent. of the stations contacted.

19. In addition to the certificates for the outright winners, in order to the value of 5 gallons will be awarded for the purchase of trophy or equipment.

The South African International DX Contest

The S.A.R.L. International DX Contest, which is now established as an annual event, will be staged during January, 1950. All licensed Amateurs throughout the world are eligible and are invited to participate in the Contest.

The Contest is divided into c.w. and telephony sections. The c.w. section commences at 0600 hours G.M.T. on Saturday, 21st January, and closes at 2359 hours G.M.T. on Sunday, 22nd January, 1950. The telephony section commences 0601 hours G.M.T. Saturday, 22nd January, and closes at 2359 hours G.M.T. on Sunday, 23rd January, 1950.

RULES OF THE CONTEST

1. All entrants are bound by the rules governing this Contest and, in the event of a dispute, the decision of the President of the S.A.R.L. shall be final.

2. Operation is restricted to the 40, 20, and 10 metre bands. Cross-band operation is not allowed.

3. Contacts with Government or unlicensed stations are ineligible for scoring purposes.

4. Proof of off-band or irregular operation submitted by the official monitor stations will disqualify the offender.

5. SERIAL NUMBERS which will be changed with each contact are to be exchanged between stations. In the case of c.w. stations, the serial will consist of a (1st) figure group, the first three figures to be the report followed by the LAST three figures of the LAST SERIAL NUMBER RECEIVED. For your first contact simply add any three figures to the report to be given. For subsequent contacts give the report followed by the serial number of the last station worked.

In the case of telephony, the serial will consist of a 5 (five) figure group, the first two figures to be the report followed by the LAST three figures of the LAST SERIAL NUMBER RECEIVED.

6. SCORING will be as follows: two points for each station worked in your own country. In the case of c.w. stations, 2, 3, 5, 8, 9, 7, 8, 9, ZEL, 1; and CR1 count two points each, making the contest virtually South Africa versus the world.

Five points for each station worked in other countries (see A.R.L. List). Multiplier is the number of countries worked on A.Z. bands.

7. Logs are to be sent to: H. R. Bennett, 47 Flower Street, Pretoria, S. Africa.

8. The contestant must submit a log sheet which will have an analysis and a signed declaration. The declaration to be as follows:—"I hereby declare that my station was operated strictly in accordance with the conditions and rules of the Contest and I agree to abide by the decision of the President of the S.A.R.L. in the event of any dispute."

9. An incomplete log or omission to submit an analysis or failure to make the declaration will disqualify the contestant.

10. The judging will be done by the S.A.R.L. Contest Committee.

11. The log sheets must show the following:—Date, Time of Contest, Band used, Call Sign, Serial Sent and Received, Points Claimed, Multiplier, Number of Countries worked.

12. All logs are to be in the hands of the S.A.R.L. Contest Committee by 80th April, 1950.

13. Certificate will be sent to the Winners of this Contest in each country outside South Africa.

BUY YOUR DX FRIEND A
YEARLY SUBSCRIPTION

TO

"AMATEUR RADIO"

THE OLD MAN

With conditions in a sorry mess, it has been impossible to criticise either good signals or bad during the last month, so perhaps a word of advice to the large number of newcomers to the Ham ranks may not be out of place. Let us either as Hams with their tickets for years, or the fellow with a ticket for six months, go out of our way to call that new call, and welcome the holder to the bands.

I can, and lots of you will, remember that very nervous feeling when we made our first calls and wondered whether the station called would come back to us. What a thrill it was to be working the fellow you had heard on the air for a long time and how nervous we felt when we tried to copy those first few c.w. contacts. If you can remember all that, then give the new Ham a call when you hear him, and a few words of wisdom that you have learnt by experience.

To the new Ham, whether he be starting off with the humble crystal oscillator feeding the aerial or a multi-stage rig, be sure that the signal you emit is one that will reflect credit upon you. YOU are judged by the signal you put out, just as much as you would be for the cleanliness or otherwise of your personal appearance.

Don't be afraid to call the older Ham. If he is the right type he will enjoy the chance of welcoming you to the air. If he is sending too fast don't, whatever you do, come back and say "received", when you only got about half. He may have asked a few questions and it is quite obvious when you do not reply, that you haven't received it. Be straight forward and tell him that you only received a portion and ask him to QRS, he will be only too glad to slow

down for you. If you're not sure of your procedure, seek out the older Ham who will be glad to put you right. Have a look at the AMATEUR CODE published recently in the Magazine and still to be seen on the front page of the Handbook. Make that your code and your starting point in Amateur Radio.

Join the local Division of your Institute and take a personal interest in its workings, offer your services in a practical way this is most important. There are far too many people who are content to let the other fellow do the job, but who are only too ready to supply lots of adverse, rather than constructive criticism.

The younger man is sadly needed in our executive ranks to-day. Far too much work is being done by men whose private avocations demand a great deal of their time.

Take care of your purchases, always have in mind when purchasing a piece of equipment whether you can, at a later stage, use it in a more practical way in a larger rig. Careful planning will enable you to save pounds through the years. This piece of advice has been learnt the hard way. Keep your rig tidy, haywire has its place in testing and trying out circuits, but it can be very dangerous, as most of us know.

Finally keep in mind you are constantly near a.c. voltages that CAN CAUSE DEATH. A recent article in "QST" pointed out that the smaller voltages can sometimes be more dangerous than larger ones. One very good tip if you must play around with the h.t. on, is to keep one hand in your pocket, but the safest of all is SWITCH IT OFF.

IONOSPHERIC PREDICTIONS FOR THE AMATEUR BANDS

JANUARY, 1950

Nine of the charts, prefixed by the letter "C" for Canberra, refer to forecasts for the South-Eastern Australian States. The remainder, prefixed by the letter "P" for Perth, are for Western Australia.

The Canberra charts refer to the following world zones:—

Zone	Region	Terminal
1	Western Europe	London
2	Mediterranean	Cairo
3	N.-West America	San Francisco
3a	N.-East America	New York
4	Central America	Barbados
5	South Africa	Johannesburg
6	Far East	Manila

The Perth charts are similar to those based on Canberra.

QUIZ

The Prediction Service welcomes comments on the accuracy of its predictions. In particular, answers to the following questions on the Perth-San Francisco circuit would be useful.

1. Was the 7 Mc. band workable from 1000 to 1600 hours G.M.T.?
2. Was the 14 Mc. band workable from 1600 to 2000 hours G.M.T.?
3. Was the 28 Mc. band workable for several hours around midnight G.M.T.?

Answers to the Quiz should be sent to the W.I.A. and should, if possible, refer to consistent results obtained on the majority of days in the month.

Accurate Frequency Transmissions for 1950 from VK3WI

During last year's four Accurate Frequency Transmissions, the Victorian Division was unable to obtain, on some nights, complete corrections on the frequencies sent, due to the times of operation clashing with other schedules at the Frequency Measuring Station at Mont Park.

Letters have come in from members asking that corrections be obtained on all future transmissions, and, with this in view, Mont Park was contacted and arrangements made to check this year's four transmissions.

To fit in with their long list of activities, it has been necessary to change the time of operation to 8.15 p.m. on Thursdays, also to reduce the time taken by transmitting every 20 Kc., instead of 10 Kc., as in the past.

Dates for the next 12 months are:—

26th January,
27th April,
26th July,
26th October.

Transmissions take place on the 7 Mc. band at intervals of 20 Kc., the frequency of the transmission being ac-

curate to better than 0.01% or 500 cycles.

The operating procedure and times of transmissions are as follows:—

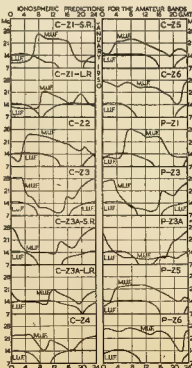
9.5 p.m.—Phone transmission on 7196 Kc. with a general call and information on what is about to take place.

9.15 p.m.—VK3WI changes frequency to 7000 Kc. and calls as follows on c.w. at 12 w.p.m.: AFT (3 times), de VK3WI (3 times), then — — — — QRG — — — — 7000 Kc. (twice). The key is then held down for one minute; then QSY 7020 Kc. (twice) de VK3WI (once) AR.

The transmitter then commences operation on 7020 Kc. and the procedure is repeated until 7200 Kc. is reached, after which there will be a phone transmission on 7196 Kc., and if corrections are immediately available, they will be broadcast at this time, also on the following Sunday's VK3WI news.

If the hour is not too late, frequency checks will then be made for any member contacting VK3WI.

Details on dial construction and calibration, also the best way to make use of these transmissions, appeared in the January, 1949, issue of "Amateur Radio" pages 14 and 16.



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- N.S.W.: JOHN MARTIN PTY. LTD., 116-118 Clarence Street, Sydney.
- QUEENSLAND: CHANDLERS PTY. LTD., Corner Albert and Charlotte Streets, Brisbane.
- WESTERN AUSTRALIA: CARLYLE & CO. LTD., Hay Street, Perth, and 397 Hannan Street, Kalbarria.
- ATKINS (W.A.) LTD., 895 Hay Street, Perth.
- SOUTH AUST.: GERARD & GOODMAN LTD., 192-196 Rundle Street, Adelaide.
- TASMANIA: W. & G. GENDERS PTY. LTD., 53 Cameron Street, Launceston, and Liverpool Street, Hobart.
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This is one of the famous old British names in radio and one that you have seen frequently advertised in English journals and therefore requires no introduction from us.

It is our policy to bring to the amateur and professional radio field in Australia only quality products in which an investment means a financial saving and an insurance of faithful and efficient performance. For this reason we are proud to mention a few of the good things made by Belling & Lee Ltd. They are obtainable from all good Eddystone distributors throughout Australia.

AERIALS.—The SKYROD anti-interference aerial is 18 feet in length, made in five sections and is complete with fittings for lashing to a chimney or to a mast head. Erected on a chimney or mast, this aerial is well free of man-made interference and vastly improves the signal-to-noise ratio.

"ELIMINOISE" is the name given by Belling Lee to a system of extremely efficient transformers and feeder cables for the eradication of noise. A complete kit is available for use with horizontal dipoles or the SKYROD vertical aerial. The kit consists of the aerial transformer L308, which is mounted right at the aerial feed point. This unit possesses a balanced RF transformer complete with Faraday screen between windings for the reduction of capacitive pick-up. The receiver "ELIMINOISE" (L307), which is mounted right at the receiver input terminals, is a similarly made RF transformer and is balanced to respond evenly over the 10-50 metre and the 200-2000 metre bands.

L1221 feeder is a 60 to 75 ohm balanced twin shielded RF cable used in conjunction with L308 and L307 above. No pick-up of noise can occur between the aerial and the receiver with this polythene insulated and screened with copper mesh type of cable.

The Belling & Lee aerial systems are available as either complete kits or may be purchased as components as desired. Noise reduction of 10 db or better is possible with the "ELIMINOISE" system and the automatic balancing of impedances adds further gain to any communication receiver.

—R. H. CUNNINGHAM AND COMPANY, MELBOURNE

The "Lenfo" Series Phased Array

BY LEN JACKSON† AND C. GIBSON,* VK3FO

With the advent of greater activity on the v.h.f. bands, and the controversy on antenna systems, we discussed and contemplated using a type of array or beam that could be easily constructed and which would require no tuning or pruning, as is necessary in the more conventional types of antenna.

To this end, the writers got together and evolved the "Lenfo" (as aptly named by Charlie, VK3BH). A lot of nights were spent with slide rule, paper, and visits to the Public Library, the results being well worth all the trouble.

When the system was all worked out, discussions with VK3EN and VK3EM resulted in their agreement with the theory, so it was decided to build up an experimental array and try it out.

VK3KE (Jim) kindly put his shack and gear (he also mowed his back lawn for the occasion) at our disposal, for which our thanks are hereby recorded. So now let's to the theory of this array.

This type of beam was first developed by Franklin, of the Marconi Company, being originally only single sided, with one quarter wavelength radiators. It was further developed by the late Howard Love (VK3KU), who duplicated it on the opposite side, giving it its present appearance of a number of folded dipoles joined centre to centre by lengths of feeder.

In the original form, a 300 ohm terminating resistor was necessary to prevent standing waves on the feedlines. In fact the whole system operates without standing waves on any part of it. This terminating resistor was retained by VK3KU.

We decided to further experiment with this type of beam and found it possible to eliminate the terminating resistor and produce the same effect by terminating in a folded dipole of 300 ohm impedance. The advantage of this is obvious, since the resistor dissipates 3 db of the total power, whereas the dipole converts this into useful radiation.

The matching stub on the front of the array was also eliminated, the array being fed by 300 ohm ribbon, connected directly into the first element. A twin lamp indicator fails to give any indication of standing waves on the feeder.

The system used at this station consists of a three element series phased array, terminated in a folded dipole, giving a total of four elements.

Field strength measurements were first made with this array, in conjunction with VK3KE, with VK3EM a very interested observer (unfortunately VK3EN was detained at night).

The forward gain over a folded dipole proved to be at least 10 db, with a front-to-back ratio of better than 20 db. These figures could not even be

approached with a conventional two or three element parasitic beam. These figures have subsequently been confirmed by "S" meter readings in a large number of contacts.

As the theory of this array has been well covered by a previous article in this magazine (Series Phased Array), it is felt that it is not necessary to go into full details of the theory here, but a few points may be of interest.

As the system operates without standing waves on any part of it, except the terminating folded dipole, ordinary calculations for antenna lengths do not hold, and it is necessary to use transmission line theory in determining the lengths of the elements.

The lengths of the elements should be measured around each folded half, and not from end to end. The length of the folded half is given by the length of a half wavelength in free space multiplied by the velocity factor of the

When the first array was built, to the measurements given in the diagram, many predictions were made that the resonant frequency would be well out of the top of the 144 Mc. band, however, the resonant point is found to be about 146 Mc., thus confirming the soundness of the theory. Hence we strongly recommend that these dimensions be used by anyone who contemplates building this array.

Since the resonance is very broad, and the performance does not change over the entire band, it is not necessary to cut the elements for the transmitting frequency. An array cut for 146 Mc. will work equally well on any part of the band. It is not necessary to stick to four elements, although this is the practicable minimum, but elements can be added indefinitely, without any change in impedance matching or dimensions, with continued improvements in performance.

Elements must be kept to an even number, however, to obtain a high back-to-front ratio, as the radiation cancels from each pair of elements in the backward direction. An odd number of elements would therefore leave one element, whose radiation was not cancelled to the back.

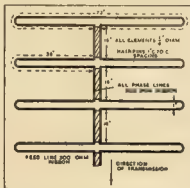
At the time of writing VK3KE and VK3EN have erected six element arrays and while it is too early yet to gauge the performance accurately, the forward gain and back-to-front ratio show appreciable improvement over the four element array.

The diagram shows dimensions and lengths for a 144 Mc. array and calculated dimensions for six metres. It has not been tried at the time of writing, but by the time this appears in print the 6 metre array should be in operation at VK3FO.

We would stress that insulation of the elements at these frequencies is of utmost importance, as r.f. is costly to generate and easily lost, so we want all the energy into the array. Keep the feed line clear of all metal work, guy wires, iron roofs, etc., as close proximity to these objects will upset the pattern of the array, and also impair the efficiency of the whole system.

Outstanding results have been obtained by VK3KE and VK3BH using the "Lenfo." VK3KE worked VK3ANW at Mount Dandenong with 3 watts input and the "Lenfo" only five feet high. Charlie, VK3BH, 16½ miles south-east of Melbourne also worked into Geelong on 144 Mc. VK3JO, also using this type of array, with about 1 watt input, is having very good results.

In conclusion we would appreciate reports of tests conducted with this array and other types of beams, so chaps please let us have your opinions as to how good or bad the "Lenfo" is.



Dimensions for 6 Metre Beam

Dimensions round ½ folded dipole, 8' 6". Phasing line, 300 ohm ribbon, 3' 9".

element as a transmission line. For the usual rod or tube form of construction, this velocity factor is about 0.5, giving as the length of the half element—

$$\frac{492 \times 0.5}{\text{Freq.}}$$

The length of the transmission line sections is one-quarter wavelength in free space, multiplied by the velocity factor of the line. If 300 ohm ribbon is used, this becomes $\frac{246 \times 0.8}{\text{Freq.}}$, or if

open wire line is used, $\frac{246 \times 0.9}{\text{Freq.}}$

The use of 300 ohm ribbon is recommended, as this is made to very fine tolerances and there is less likelihood of impedance variations than in open wire lines.

† "Amateur Radio," May, 1948, page 3.

† 8 Austin Street, Bentleigh, S.E.14, Vic.
* 424 Centre Rd., Bentleigh, S.E.14, Vic.

Compiled by J. K. RIDGWAY, VK3CR

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Abstracts from Overseas Magazines

"SHORT WAVE MAGAZINE," SEPTEMBER, 1949—

- P. 498: "Top Band Cabinet Transmitter." J. N. Weller, G6JL. 7 Mc. Transmitter. First of a series of fully detailed constructional articles using only standard parts so that the exact construction can be repeated by all interested.
- P. 503: "Window Beam for Tan?" R. W. Rogers, G5TV. Isolating three element beam with the ends of the elements bent down. Installed in a loft.
- P. 500: "Mure on the Grid Dip Oscillator." D. P. Stevens, G5BVH.
- P. 512: "Barograph V.F.O. Unit." J. M. Roe, G5VV. Uses type M1-19457-A.
- P. 514: "Double Superhet for Tan?" A. B. Wright, G5FW. Continued from August.

"WIRELESS WORLD," SEPTEMBER, 1949—

- P. 386: "Valve Megohmmeter." W. H. Coaley. Linear scale, two ranges covering 5,000 ohms to 5 megohms.
- P. 391: "Audio Signal Generator, Part 2." M. G. Scroggie. Description of an elaborate signal generator.
- P. 393: "Edgewise Model '680'." Test Report. Full description of the "680." Circuits of the v.f.o. coupling system, crystal filter, detector, a.v.c., noise generator, and B. beam.
- P. 348: "Electronic Circuitry." J. McG. Sowerby. (i) RC oscillators, e.g. a Wien bridge RC or cathode. (ii) Cathode coupled amplifiers and phase splitters.
- P. 349: "Generalised Graphs." "Cathode Ray"

"RADIO AND TELEVISION NEWS," SEPT., 1949—

- P. 37: "A Band-Switching V.F.O. Enthusiast Unit." P. V. R. Drenner, W6LQS. An Australian might call this 14 valve gadget a band-switching transmitter. A standard handbook design of v.f.o., plus double-stroke, 500 mc. and 807 beam.
- P. 40: "SW Modulating the 829B." G. L. Woolley, W6WSD. Half the 829B acts as an r.f. amplifier. The other half acts as audio amplifier, the common screen and cathode providing the modulating coupling.
- P. 42: "Fetial Signal Tracer." J. L. Barber. No batteries. Uses 120A crystal rectifier.
- P. 51: "Sweep Generator Adjustment of Transistor Lines and Antennae." J. A. Cornell. Accurate impedance matching with sweep generator and c.r.o.
- P. 54: "The Beginning Amateur, Part 3." R. H. Herring, W6JJD. Discussion on 100 watt transmitters.
- P. 57: "Shielding Against T.V.I." P. B. Rand, W6WBM.
- P. 61: "Modern Television Receivers." M. S. Kiver. Vertical sweep systems of typical American commercial receivers.
- P. 54: "Build This Experimental Power Supply." R. Turner, K6AL. Conventional power supply plus pair of 829A as electronic variable's dropping resistors. If you don't know this useful idea, try it some time. Take a 6L6 (or 807, or 6V5, etc.), connect plate and screen together to form a triode. Put d.b. in at the plate and take it out at the cathode. Connect a 100,000 pot (linear for preference) from cathode to ground. Connect grid to moving contact of pot. Varying the pot varies the bias on the grid, varying the drop across the tube and so the output voltage. If one tube won't stand the current drain, put more in parallel. A filter condenser across the output is useful. Connect filament winding to cathode potential.
- P. 67: "The Television Reel-in Antenna." B. V. K. French. Many types of v.h.f. antenna.

"CQ," SEPTEMBER, 1949—

- P. 18: "The Ultimate in Converters." J. E. Stacey, W6HIM. Very good article on the use of electronic circuit. Discusses the best tubes to use (6AR5 triode into 6J4 or half 6J8), together with full circuit details of the ultimate (almost) in low noise converters for 25, 50, 144 and 300 Mc.
- P. 20: "A Composite Chart of Standard Colour Codes." A. Soufer.
- P. 21: "Data on the BC610 Tank Coll." F. Black, W6H80.
- P. 22: "Multi-Band Rotary." B. Hauser, W6FBA. 33 ft. elements which act as half wave radiators on 14 Mc. and as two half waves in phase on 21 and 28 Mc. The parasitic elements have stubs in the centre whose effective length is changed by relay. The driven elements can be switched between three different networks so as to operate flat feeders on all bands.
- P. 23: "Winning Three Falls from Gorgonzola George." W. L. Orr, W6SAL. Case history of a successful 14 Mc. T.V.I. house cleaning job.
- P. 31: "On a Cycle Right for You." W. R. Anderson, W6JAE. How to operate transmitters, relays, relay from a supply whose frequency is different from that for which the unit was designed.

- P. 32: "Hobby for the Handicapped." H. B. Brier, W6WZQ. Actual cases of the value of Amateur operating as a healer.
- P. 33: "Screen Grid Modulating the Command Rider." R. R. Hall, W6CRO. Standard screen mod. applied specifically to a Command transmitter.

"QST," SEPTEMBER 1949—

- P. 13: "A Simplified Circuit for Audio Image Rejection." G. Grammer, W6DP. Applies audio phasing principle to c.w. beat note reception to remove the audio image. This, together with a peaked audio amplifier, should do as good a job as a crystal filter.
- P. 20: "The Gamma Match." H. H. Washburn, W6W7E. To match co-ax to the driven element of a beam, half a T match serves.
- P. 21: "450 Watts on V.H.F." C. V. Chambers, W6W5Q. 450 watt triode-tetrode, 6AR5 doubler, 633A amplifier or tripler, 535A 144 Mc. amplifier driving p-n 465A amplifier. The final amplifier tank is novel. On 144, it acts as a quarter wave linear tank. On 50 the shunting bar across the lines is removed and a coil plugged in.
- P. 29: "A 1950 V.F.O. Exciter." R. Goodman, W6DZ.
- P. 49: "Vertical Beams on 14 Mc." A. D. Mayo, W6DFD. Results obtained with driven element plus co. parasitic element.
- P. 52: "Hints and Klacks." (i) Low-power AC-DC transmitter. (ii) Broadcast band coverage with the BC348Q. (iii) Cure for "Talk-back" in the BC610. (iv) Lock on for the T17B hand microphone. (v) Use for the 90R17A dynamotor.

"CQ," OCTOBER, 1949—

- P. 11: "T.V.I. Free Rug for 10." M. Seybold, W6EVL. The length to which shielding is carried has to be seen to be believed.
- P. 13: "Crising the Gold-Plated Special." J. Kirk, W6DDE. Using the National continuous tuning all-band tank.
- P. 18: "Neglected Out-Phasing System of Modulation." W. H. Hartman, W6AF. The output from the base oscillator is split into two channels with a 500-ohm phase shift between them. Each channel is phase modulated by the audio and then amplified up to the desired power. The outputs of final amplifier of each channel are combined and fed to the antenna. The audio equipment is simple, the power economy is high, but since the r.f. section must be in duplicate, the use of the system for amateurs is doubtful.
- P. 27: "Hobby for the Handicapped, Part 2." H. B. Brier, W6WZQ.
- P. 30: "Inside the Shack and Workshop." (i) R.F. gain control for the 6A1. (ii) Improving the Collins 76A noise limiter; substitutes 12B6 for 6H6, operating the 12 volt filament on 6 volts.

reduces beam pickup. (iii) Conversion of BC463 to the broadcast band. (iv) Low voltage tap on Bridge rectifiers, from the centre tap of the transformer supplying a bridge rectifier can be drawn a rectified voltage approx. half that of the main output.

- P. 31: "Selenium Supply." L. V. Broderson, W6QVY.

"WIRELESS WORLD," OCTOBER, 1949—

- P. 303. "Magnetic Recording Technique." D. Roe.
- P. 365 "High Quality Amplifier—New Version." D. T. N. Williamson.
- P. 370 "Microwave Lenses." O. Suskind.
- P. 389 "Smoothing Circuits, Part 1." R. "Oshide Ray." The good old 6C2 filter.
- P. 393 "Electronic Cavity." J. McG. Sowerby. (i) Direct current stabilisers, (ii) Neutralising the cathode coupled phase splitter for improved high frequency response.
- P. 398. "Verted Loudspeaker Cabinets." C. T. Chapman.
- P. 401: "Reflex Valve Voltmeter." M. G. Scroggie. Single valve voltmeter with 5, 20 and 50 volt ranges and minimum stability.
- P. 408. "Properties and Uses of Negative Temperature Coefficient Resistors." "Thermistors."

A.O.C.P. CLASS

The Victorian Division A.O.C.P. Class will commence on Thursday, 12th January, 1950. Lectures are held on Monday and Thursday evenings from 8 to 10 p.m. Persons desirous of being enrolled should communicate with Secretary W.L.A., Victorian Division, 191 Queen St., Melbourne (Phone FJ 6997 from 9 a.m. to 6 p.m.), or the Class Manager on either of the above evenings.

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FEDERAL, QSL, and DIVISIONAL NOTES

Federal President: W. R. Greenow, VK3WG; Federal Secretary: W. T. S. Mitchell, VK3UM, Box 2611W, G.P.O., Melbourne.

NEW SOUTH WALES

Secretary—Geo. Cammison (VK3QC), Box 1784, G.P.O., Sydney.

Meeting Night—Fourth Friday of each month at the Science House, Corner Gloucester and Essex Sts., Sydney.

Divisional Sub-Editor—L. D. Oulfe, VK3AM, 14b Wilson Street, Neutral Bay, N.S.W.

Zona Correspondents—North Coast and Tablelands: P. A. H. Alexander, VK2PA, Hill St., Port Macquarie; Newcastle: H. Whyte, VK2AFA, Vale St., Birmingham Gard, Newcastle; Coffsfield and Lismore: H. Rawkins, VK3JL, 87 Coffsford Ave., Coffsfield; Western: G. J. Russell, VK3QA, 118 Dogan St., Nyngan; South Coast and South-West: H. B. Bayers, VK2DO, 42 Pettit St., Yass; Western Sub-Eds.: A. C. Santos, VK3AJB, 48 Harrahbrook Ave., Five Dock, Eastern Suburbs; H. Kerr, VK3AL, No. 4 Flat, 144 Hewlett St., Bronte, North Sydney; C. Oulfe, VK3AM, 779 Military Rd., Mosman; St. George: J. A. Ackerman, VK3AL, 38 Park Rd., Carlton, South Sydney; V. E. Wilson, VK3VW, Or. Will St. M. and Marine Pde., Maroubra.

VICTORIA

Secretary—C. C. Quin, VK3WQ.

Administrative Secretary—Mrs. O. Cross, Law Court Chambers, 191 Queen St., Melbourne, G.T.

Meeting Night—First Wednesday of each month at the Radio School, Melbourne Technical College.

Zona Correspondents—North Western: R. E. Trebilcock, VK3TL, 185 Victoria St., Kerang; Western: C. C. Quin, VK3WQ, 12 Sturt St., Stawell; South Western: W. S. Ross, VK3UT, Ballantray, via Warrnambool; North Eastern: J. A. Miller, VK3AB, "Edinburg", Avenue, Far North-Western Zone; Harry Doolan, VK3AM, 48 Walnut Ave., Mildura; Eastern Zone: Mrs. P. M. Churchward, VK3US, "Briarley", Red Hill.

FEDERAL

DX C.C. LISTING

As there appears to be several anomalies in the present Rules, it is anticipated that at the 20th Convention, a considerable effort will be given, so if you have any grounds for constructive comments now is your opportunity to send them to your Divisional Committee for inclusion on the Agenda.

PHONE

VE3JD (1)	..	..	..	86	150
VK3RU (2)	..	..	..	87	145
VK3RW (4)	..	..	..	37	124
VE3BZ (2)	..	..	..	86	140
VE3BE (18)	..	..	..	113	
VE3BD (8)	..	..	..	112	
VK3JP (8)	..	..	..	108	
VK3IN (11)	..	..	..	103	
VE3JE (7)	..	..	..	100	
VK3ES (9)	..	..	..	100	
VE3DS (8)	..	..	..	100	

C.W.

VE3BE (8)	..	..	..	40	137
VE3CN (1)	..	..	..	40	143
VK3VW (4)	..	..	..	39	144
VE3EL (9)	..	..	..	39	134
VK3OL (5)	..	..	..	40	133
VK3BE (18)	..	..	..	39	138
VK3BK (8)	..	..	..	69	121
VK4HR (8)	..	..	..	60	118
VK4RP (14)	..	..	..	38	118
VK4SD (3)	..	..	..	37	118
VK3FN (15)	..	..	..	37	115
VE4DA (7)	..	..	..	35	111
VK3NC (19)	..	..	..	Member	101

OPEN

VE3BE (4)	..	..	..	46	178
VE3BZ (5)	..	..	..	46	178
VK3DH (2)	..	..	..	40	150
VK3JE (12)	..	..	..	89	132
VE3HQ (2)	..	..	..	40	146
VK3RW (7)	..	..	..	40	148
VE3RW (13)	..	..	..	39	144
VE3MC (5)	..	..	..	39	138
VK3BE (11)	..	..	..	115	
VK4UL (10)	..	..	..	69	134
VE3ADE (28)	..	..	..	133	
VK3OP (19)	..	..	..	133	

An application for membership may be received from VK3BE and is being checked.

COUNTRIES LIST

Elsewhere in this issue will be found the latest list of DX Countries and the current prefixes. Submit your cards for DX C.C. in that order.

WI BROADCASTS

All Amateurs are urged to keep these frequencies clear during, and for a period of 15 minutes after, the official Broadcasts.

VK2WI—Sundays, 1100 hours EST, 7195 Kc. and 2000 hours EST, 504 Mc. No frequency checks available from VK3WI Intra-State working frequency, 7177 Kc.

VK3WI—Sundays, 1100 hours EST, simultaneously on 3380 and 7195 Kc. and re-broadcast on 50 and 144 Mc. bands. Intra-State working frequency 7195 Kc. Individual frequency checks of Amateur Stations given when VK3WI is on the air.

VK4WI—Sundays, 0900 hours EST simultaneously on 3750 Kc., 7195 Kc., 14345 Kc., 52.4 Mc. and 144.135 Mc. Frequency checks are given two nights weekly, and the times are announced during Sunday broadcasts. 7085 Kc. channel is used from 1000 to 1030 hours each Sunday as VK4 query service to VK4WI.

VK5WI—Sundays, 1000 hours SAST, on 7194 Kc. Frequency checks are given by VK6WD on Friday evenings on the 7 and 14 Mc. bands.

VK6WI—Saturdays 1400 hours, Sundays 0900 hours WAST, on 7195 Kc. No frequency checks available.

VK7WI—Second and Fourth Sundays at 1000 hours E.S.T. on 7195 Kc. No frequency checks are available.

RADIO CONTROL OF MODELS

Another frequency band has been allocated for the radio control of model aircraft, the 27 Mc. i.s.m. band. These bands are now as follows:—
16,957 to 17,352 Mc.
46.44 to 46.58 Mc.

A special permit is required to operate models on these two channels, and special application must be made to the Chief Inspector (Wireless) stating details of proposed equipment, type of equipment and circuit to be used, and precise location in which to be operated. These applications are not restricted to Amateurs, but other details must be supplied if the applicant is under age. Licensed Amateurs may use 144 Mc. and higher frequencies without any additional permit.

23 "GENTLEMEN'S AGREEMENT"

Still another Society to add to the list of those endeavoring to equitably allocate the bands between Phone and C.W. is the S.A.R.L. They have advocated the following distribution:—

2400—2800 Kc.	C.W. only
3500—4000 Kc.	Phone only
7000—7600 Kc.	C.W. only
7600—7100 Kc.	C.W. and Phone
7100—7150 Kc.	Phone only
14000—14100 Kc.	C.W. only
14100—14350 Kc.	Phone only
21000—21100 Kc.	C.W. only
21100—21450 Kc.	Phone only
25000—26300 Kc.	C.W. only
26300—26700 Kc.	Phone only

AMATEUR STATIONS ABOARD SHIPS

As at present laid down in the R.M.G.'s Handbook, para. 50, Amateur Stations may be operated

W.I.A. ACTIVITIES CALENDAR

Jan. 14-15: S.E.R.U. C.W. Contest.
Jan. 22-23: B.E.R.U. Phone Contest.
Jan. 28-29: W.I.A. National Field Day Cont. and S.E.R.U. C.W. Contest.
Jan. 31: Membership Roll of each Division due at F.E.
Feb. 19: 20th Convention Items due at F.E.
Feb. 28: Convention Papers due with F.E.
End of fiscal year of Divisions.
Mar. 10: Agenda for 20th Convention issued.
Mar. 17: Annual Pw-Capita due not later than this date.
Mar. 31: End of fiscal year for F.E.

QUEENSLAND

Secretary—W. L. Stevens, VK4TB, Box 6367, G.P.O., Brisbane.

Meeting Night—Last Friday in each month at the Y.M.C.A. Rooms, Edward Street, Brisbane.
Divisional Sub-Editor—F. B. Shannon, VK4SN, Minden, via Rosewood.

SOUTH AUSTRALIA

Secretary—E. A. Barber, VK5MD, Box 1234K, G.P.O., Adelaide.

Meeting Night—Second Tuesday of each month at 17 Wymouth Rd., Adelaide.
Divisional Sub-Editor—W. W. Parsons, VK5PB, 463 Esplanade, Henley Beach.

WESTERN AUSTRALIA

Secretary—W. E. Coxon, VK6AG, 7 Howard St., Perth.

Meeting Place—Padbury House, Cur. St. George's Ter. and King St., Perth.
Meeting Night—Watch the Monthly Bulletin.
Divisional Sub-Editor—George W. Ashley, VK6GA, 35 Mare Street, Carlisle, Western Australia.

TASMANIA

Secretary—R. D. O'May, VK7OM, Box 871B, G.P.O., Hobart.

Meeting Night—First Wednesday of each month at the Photographic Society's Rooms, 163 Liverpool St., Hobart.
Divisional Sub-Editor—Capt. R. J. Cruise, VK7EJ, Anglesea Barracks, Hobart.

Northern Correspondent: C. P. Wright, VK7LZ, 9 Knight St., Launceston.

Abroad Australian ships in Australian waters only. This has now been amended so that a station licensed may now do so anywhere in the world, provided that when in the port or anchored in any foreign port or in the waters of any foreign country, the station will not be operated. The Handbook will at a later date be amended to this effect.

SLOW WAVE TRANSMISSIONS

The following transmissions from the official W.I.A. stations are given on 2,324 Kc. on the day and times shown below.

Sunday—VK3WI, 2000 to 2100 hours E.A.S.T.
Monday—VK3WI, 2000 to 2030 hours E.A.S.T.
Tuesday—VK4WI, 1900 to 2000 hours E.A.S.T.
Wednesday—VK3WI, not at present
Thursday—VK4WI, 1930 to 2000 hours E.A.S.T.
Friday—VK7WI, 2000 to 2100 hours E.A.S.T.

NATIONAL FIELD DAY CONTEST

Elsewhere in this issue appears the Rules of the 1949 W.I.A. National Field Day Contest to which some minor changes have been made. Last year's effort was patronised fairly well, but we cannot but feel that it does not yet enjoy the popularity it merits. Here is your chance to suit your portable gear under portable conditions, and at the same time compete for a money order for equipment or trophy.

The v.h.f. boys are also started; so, on here's their chance also for a pleasant outing and a furthering of their experimenting. Let's make this N.F.D. a bumper one.

FEDERAL QSL BUREAU

RAY JONES, VK3RU, MANAGER

Under date of 17th November, 1949, Noel Roberts, ex-VK3NR, writes: "I am leaving Norfolk Island in a few days for New Zealand where I will be stationed at Christchurch for a few months before shoving off for Samoa. I will be on from Samoa, of course, under a R.M.S. call sign but do not know whether I will get on from the Christchurch QTH. Will be sending a stack of cards a.m.g. soon as I expect a new bunch from the printer any day now, so the boys will be getting them. Would you pass the word along asking stations to put the correct date-time on their cards. I get quite a few with vague dates and at first suspect them as 'typists' but sometimes I like the QSO in the long way off of the date shown on the card. I feel some some blokes may have missed a card on this account so I am careful in checking that a QSO did actually take place before returning a card to sender. I only made 98 countries from this job

Page 15

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PT1400—425, 565 v. per side C.T. 250 Ma., 2 x 2.5v. 2.5a.,
2 x 6.3v. 3a., 5v. 3a.
PT1371—500, 750, 1,000 v. per side C.T. 300 Ma.
PT1368—1,000, 1,250, 1,500 v. per side C.T. 200 Ma.
PT1316—10v. tapped at 5v. and 7.5v. 6a.
PT1525—2.5v. 10a. for 866s, 1,000 v. DC Work. Insulation.
PT1305—2.5v. 10a. for 866s, 2,500 v. DC Work. Insulation.

Z1012—35h. max. 20h. 100 Ma. DC, 430 ohms, 1,000 v. DC working.
Z956—30h. max. 20h. 200 Ma. DC, 160 ohms, 1,000 v. DC working.
Z962—"Swinging" Choke 20/200 Ma. DC, 100 ohms, 1,000 v. DC working.
Z983—"Swinging" Choke 30/300 Ma. DC, 90 ohms, 1,000 v. DC working.
Z986—15h. max. 10h. 300 Ma. DC, 60 ohms, 1,000 v. DC working.

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T.C.C. 1.5 uF. 4,000 v.w. Condensers, £2 each. Chanex 2 uF. 3,000 volts d.c. working, £1/15/- each.
Ferranti 0-500 Microampere Meters, laminised dial, new, £2 each.

VALVES—R.C.A. 834, new, £1/8/- ea. Sylvania 807s, 15/- ea. R.C.A. 6U7Gs, new, sealed cartons, 9/- ea. Sylvania 6X5GTs, new, sealed cartons, 10/- ea.

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CRYSTALS, as illustrated, 40 or 80 mx., AT or BT cut. Accuracy 0.02% of your specified frequency, £2/12/6 each.

20 metre Zero Drift, £5 each.

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A.W.A. Split Stator Transmitting Condensers, high voltage, £2/15/- each.

Screw-type Neutralising Condensers (National type), suits all triode tubes, Polystyrene insulation, 19/6 ea.

Prompt delivery on all Country and Interstate Orders.

Satisfaction Guaranteed.

BRIGHT STAR RADIO

1839 LOWER MALVERN ROAD, GLEN IRIS, VIC. Phone: UI. 5510.

Fishers—Eric No 1 and No 2 designers and builders of 3AMV were also there. Looks like another Ham in Yan, he was a Radio Mechanic in the R.A.A.F. and very active in the running track and neck with radio, but use of a 5 x 5's makes it impossible to receive local stations. Finally after a long wait, the 3AMV was finally in his engagement, plenty of 88s but no 33s there was a lot. Many thanks to G2G, ZAKR, 2GAG, EKR and families for the West. Very friendly family what we was known for the 30 station from the Central West fitted into an 8/40? It couldn't have been comfortable, allowing for the portable gear and line noise.

—see notice—

VICTORIA

SOUTH WESTERN ZONE CONVENTION

The zone's Convention, held at Ballarat on the week-end of 25th and 27th November, was agreed to be an unequalled success by those who attended. The attendance upon members was 100, appointing, only four members outside Ballarat making an appearance. It is understood that many clubs were unable to be present, but apparently others did not consider the trip worthwhile since there was no business meeting.

We were pleased to welcome a large contingent from the 3AMV, who were in the area for the week-end. On Saturday afternoon a round of shack visits took place and the mighty 3HW beam was personally inspected. A great deal of work was done by the numerous 313s on about at 30R. Thirty-five showed up for dinner at a local hotel and went well except for 3BU who couldn't get any cream. We did the entertainment, with 313s and 314s entertained with a show of music, very much appreciated by all. 3SE then presented a picture show of the after-dinner entertainment, a portion of all and all departed at an early date to prepare for the big day.

Sunday found everyone installed on the picnic ground at Lake Burramet, before dinner and the air was soon a trap for birds with antennae strung in all directions.

After a short concert was conducted, the winner being 3AGD, ably supported by 3AKR. Those boys really believe in operating de luxe. I have no suspicion that we may hear more from these boys regarding their work, but they were heard, one for single men and another for married men. Who was it bit the dust in the latter case?

Competitions for home-built equipment proved to light some very nice equipment, particularly the 313s. A prize was presented, was given to the visitors by 3BU to which our State representative replied. A vote of thanks was passed to the ladies for their work in preparing the meals. Afternoon tea was served and a considerable amount of snatching, the party broke up.

Any note of doings in the South Western Zone may be found in the 313s, 314s, 315s, 316s, 317s, 318s, 319s, 320s, 321s, 322s, 323s, 324s, 325s, 326s, 327s, 328s, 329s, 330s, 331s, 332s, 333s, 334s, 335s, 336s, 337s, 338s, 339s, 340s, 341s, 342s, 343s, 344s, 345s, 346s, 347s, 348s, 349s, 350s, 351s, 352s, 353s, 354s, 355s, 356s, 357s, 358s, 359s, 360s, 361s, 362s, 363s, 364s, 365s, 366s, 367s, 368s, 369s, 370s, 371s, 372s, 373s, 374s, 375s, 376s, 377s, 378s, 379s, 380s, 381s, 382s, 383s, 384s, 385s, 386s, 387s, 388s, 389s, 390s, 391s, 392s, 393s, 394s, 395s, 396s, 397s, 398s, 399s, 400s, 401s, 402s, 403s, 404s, 405s, 406s, 407s, 408s, 409s, 410s, 411s, 412s, 413s, 414s, 415s, 416s, 417s, 418s, 419s, 420s, 421s, 422s, 423s, 424s, 425s, 426s, 427s, 428s, 429s, 430s, 431s, 432s, 433s, 434s, 435s, 436s, 437s, 438s, 439s, 440s, 441s, 442s, 443s, 444s, 445s, 446s, 447s, 448s, 449s, 450s, 451s, 452s, 453s, 454s, 455s, 456s, 457s, 458s, 459s, 460s, 461s, 462s, 463s, 464s, 465s, 466s, 467s, 468s, 469s, 470s, 471s, 472s, 473s, 474s, 475s, 476s, 477s, 478s, 479s, 480s, 481s, 482s, 483s, 484s, 485s, 486s, 487s, 488s, 489s, 490s, 491s, 492s, 493s, 494s, 495s, 496s, 497s, 498s, 499s, 500s, 501s, 502s, 503s, 504s, 505s, 506s, 507s, 508s, 509s, 510s, 511s, 512s, 513s, 514s, 515s, 516s, 517s, 518s, 519s, 520s, 521s, 522s, 523s, 524s, 525s, 526s, 527s, 528s, 529s, 530s, 531s, 532s, 533s, 534s, 535s, 536s, 537s, 538s, 539s, 540s, 541s, 542s, 543s, 544s, 545s, 546s, 547s, 548s, 549s, 550s, 551s, 552s, 553s, 554s, 555s, 556s, 557s, 558s, 559s, 560s, 561s, 562s, 563s, 564s, 565s, 566s, 567s, 568s, 569s, 570s, 571s, 572s, 573s, 574s, 575s, 576s, 577s, 578s, 579s, 580s, 581s, 582s, 583s, 584s, 585s, 586s, 587s, 588s, 589s, 590s, 591s, 592s, 593s, 594s, 595s, 596s, 597s, 598s, 599s, 600s, 601s, 602s, 603s, 604s, 605s, 606s, 607s, 608s, 609s, 610s, 611s, 612s, 613s, 614s, 615s, 616s, 617s, 618s, 619s, 620s, 621s, 622s, 623s, 624s, 625s, 626s, 627s, 628s, 629s, 630s, 631s, 632s, 633s, 634s, 635s, 636s, 637s, 638s, 639s, 640s, 641s, 642s, 643s, 644s, 645s, 646s, 647s, 648s, 649s, 650s, 651s, 652s, 653s, 654s, 655s, 656s, 657s, 658s, 659s, 660s, 661s, 662s, 663s, 664s, 665s, 666s, 667s, 668s, 669s, 670s, 671s, 672s, 673s, 674s, 675s, 676s, 677s, 678s, 679s, 680s, 681s, 682s, 683s, 684s, 685s, 686s, 687s, 688s, 689s, 690s, 691s, 692s, 693s, 694s, 695s, 696s, 697s, 698s, 699s, 700s, 701s, 702s, 703s, 704s, 705s, 706s, 707s, 708s, 709s, 710s, 711s, 712s, 713s, 714s, 715s, 716s, 717s, 718s, 719s, 720s, 721s, 722s, 723s, 724s, 725s, 726s, 727s, 728s, 729s, 730s, 731s, 732s, 733s, 734s, 735s, 736s, 737s, 738s, 739s, 740s, 741s, 742s, 743s, 744s, 745s, 746s, 747s, 748s, 749s, 750s, 751s, 752s, 753s, 754s, 755s, 756s, 757s, 758s, 759s, 760s, 761s, 762s, 763s, 764s, 765s, 766s, 767s, 768s, 769s, 770s, 771s, 772s, 773s, 774s, 775s, 776s, 777s, 778s, 779s, 780s, 781s, 782s, 783s, 784s, 785s, 786s, 787s, 788s, 789s, 790s, 791s, 792s, 793s, 794s, 795s, 796s, 797s, 798s, 799s, 800s, 801s, 802s, 803s, 804s, 805s, 806s, 807s, 808s, 809s, 810s, 811s, 812s, 813s, 814s, 815s, 816s, 817s, 818s, 819s, 820s, 821s, 822s, 823s, 824s, 825s, 826s, 827s, 828s, 829s, 830s, 831s, 832s, 833s, 834s, 835s, 836s, 837s, 838s, 839s, 840s, 841s, 842s, 843s, 844s, 845s, 846s, 847s, 848s, 849s, 850s, 851s, 852s, 853s, 854s, 855s, 856s, 857s, 858s, 859s, 860s, 861s, 862s, 863s, 864s, 865s, 866s, 867s, 868s, 869s, 870s, 871s, 872s, 873s, 874s, 875s, 876s, 877s, 878s, 879s, 880s, 881s, 882s, 883s, 884s, 885s, 886s, 887s, 888s, 889s, 890s, 891s, 892s, 893s, 894s, 895s, 896s, 897s, 898s, 899s, 900s, 901s, 902s, 903s, 904s, 905s, 906s, 907s, 908s, 909s, 910s, 911s, 912s, 913s, 914s, 915s, 916s, 917s, 918s, 919s, 920s, 921s, 922s, 923s, 924s, 925s, 926s, 927s, 928s, 929s, 930s, 931s, 932s, 933s, 934s, 935s, 936s, 937s, 938s, 939s, 940s, 941s, 942s, 943s, 944s, 945s, 946s, 947s, 948s, 949s, 950s, 951s, 952s, 953s, 954s, 955s, 956s, 957s, 958s, 959s, 960s, 961s, 962s, 963s, 964s, 965s, 966s, 967s, 968s, 969s, 970s, 971s, 972s, 973s, 974s, 975s, 976s, 977s, 978s, 979s, 980s, 981s, 982s, 983s, 984s, 985s, 986s, 987s, 988s, 989s, 990s, 991s, 992s, 993s, 994s, 995s, 996s, 997s, 998s, 999s, 1000s.

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A. Butler (3BR) and P. Syme (5BR) were down at the Mound doing a job at the local drome. They are visiting the various Hums about the place in their spare time, although the local boys are not very worried, having successfully withstood visits from 5MD and 5BR quite recently. 5GR, having been ordered to the Mound, is now waiting for his finishing touches to the aerial array which will be a little series phased affair. If any of the city 2 metre gang suffer with burnt out aerial coils, it could be Claude with his beam pointed North West.

The lecture of the evening was given by 6KW and the subject was of popular interest. The "bubbling-out" of unwanted frequencies in the modulation to reduce the spread under modulation. Methods were described of simple and effective clipping of the modulation and approximately the same range of 500-3,000 cycles. Reminded me of recorder to demonstrate the fact that the addition of the limiting device made no apparent difference to the quality of the audio on the transmission.

A short demonstration of v.h.f. gear operating mobile on 144 Mc. was given by 6AG and 6RU using 532s. Wally drove his car up the Terrace

428 BOURKE STREET, MELB

I suppose at some time or other most of the married Harms have had the experience when working on some piece of equipment late at night of getting numerous calls from the XYL to come to bed, etc., etc. Well it's happened in reverse! This time the XYL of a certain family was building the

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modulator of the new rig and the OM was twiddling his fingers. Around about midnight the conversation continued. The OM said:

OM: "Don't you think it's time you knocked off and went to bed?"

XYL: "No, yes, I've still got to hook up the antenna and the line."

Ten minutes later:

OM: "Hey! S— why don't you give it away, it's past midnight."

XYL: "I've just got a few more leads to put in and I'll be finished."

OM: "Goodness me S— there's no doubt about this! The Radio men you get going, there is no stopping you etc. etc."

The foregoing stories are quite true and if certain people don't come across with a pair of 800s or similar, I may be forced to divulge names to the public. I hope that the OM will come on any further, "A.R." will be dubbed as a scandal sheet, an echo for you and don't forget to let me have any dope that YOU might overhear.

NORTHERN ZONE

No lecture was given at the November meeting of this zone as it had previously been agreed that the time be made available for social and W.I.A. business. Several items were discussed, these included the emergency network, also the coming Federal Convention.

Our message to State Headquarters' circular on emergency equipment was very disheartening, however T7E and FAM have now taken this matter in hand and it is hoped that an efficient self-powered emergency station will be the result.

T7F, T8Q and 7LZ have been keeping a check on 33 Mc. meters, however nothing has as yet been heard although 33 Mc. meters excite the different 33 Mc. beacons have come through at good signal strength.

T8E is keenly efficiently handling the DX for the zone, whilst T7C, T7E, TDB, T7F and T8Q are all active on 144 Mc.

Our State Secretary advises that only two VK7s have forwarded their logs for the recent VK-ZL DX Contest, so it looks as though the other VK7s, like those in this zone, decided that it just wasn't worth the fight.

As our zone does not wish to place too heavy a burden on our very willing, but none-too-numerous, lecturers it was decided that our next meeting take the form of an impromptu soiree. All Members attending will be divided into two teams and an independent adjudicator will then advise the subject to be debated. It is expected that an interesting and humorous evening will be the result. It is yet to be decided as to whether a meeting will be held in January, however, all members will be advised accordingly in due course.

FIFTY MEGACYCLES & ABOVE

(Continued from Page 13)

Conditions at Geelong have been really excellent on some nights during November with signals up to six S points above their normal value and it is felt that on nights like these, much more distant contacts could be made if stations were on. As a guide, it has been noticed that these conditions are usually prevalent on a warm night just preceding a cool change, so if those contacts who have the gear could put out a few calls in the direction of Melbourne and Geelong when they note these weather conditions, some interesting contacts might be made.

While on this subject we would ask Melbourne stations to keep their beams turning when looking over the band and stations in Melbourne to look to the north of the city, did that they are missing out on contacts due to the beams being always side on.

An interesting contact was made on the 18th November when 8C1 portable, six miles south of Tatura, worked 8ABA in Box Hill, a distance of 90 miles, the dividing range in between. 8C1 was receiving 8ABA on 14 signals steady, while 8ABA was receiving an 8H signal with some QSB.

CLASSIFIED ADS.

Advertisements will be accepted under this heading from the trade, and/or others who are actively engaged in trading as a livelihood. Rate: 15/- per inch.

100 and 1,000 Kc. CRYSTALS

100 and 1,000 Kc. genuine G.E. vacuum mounted Crystals, 0.01% accuracy, brand new; suitable for Bendix Meters and other instruments. £5/5/- plus sales tax (8/9) each, posted. R. H. Cunningham and Company, 62 Stanhope Street, Malvern, Vic. UY 6274.

8AKE has been working on 144 Mc. and has now got 880 Mc. In his blood, so he may be on that band soon. 8TV has not been on much, but 8BW, still having contacts on 2 and 6 metres.

TASMANIA

From north-west we hear that T8B is using an 8C1225 and works cross-band with T8B who receives him on a broad-band converter. T8B prefers converter to 8C1225 receiver. T7F now has a 144 Mc. instrument and is interested in working OM. Has sent his converter over to 8AKE to have it compared with VK3 receivers. T8J has new converter but no sign to listen to as yet.

Newcomer in Hobart is Ted Nicholls, T7Y, experimenting with super regens and uses coupled oscillator with pair CV40s. T8B having loads of fun working mobile in car with mod. osc. He is convinced that after a little more work he will work one needs fairly high power and crystal control. Says he can receive T8B from Rosny Hill quite strongly around and about Hobart.

288 AND 576 Mc. JOYTINGS

3WD, 2EO, and 3L6 are testing gear on the 288 Mc. band and will probably have contacted by the time this appears. Gear being used consists of modified 8C1225 and 8C1225. 3WD has also been testing an 823 as a push-push doubler from 144, using series tuning. This would give a promising arrangement and may offer an easy way of working with 144 Mc. gear coming up in 832s to get on the band.

This has been a month of achievements as far as 276 Mc. band is concerned. With gear being used consisting of new components and 8C1225s have been made, and distance records broken. 3DA, of Caulfield, has worked 8RR at McCrae, 85 miles, with 50 signals both ways, over a practically line of sight path. 8RR has improved his signal by putting up a 60 degree corner reflector, and also has a self-sequenced super regens using an 8L19 working very well. 8RR and 3DA have contacted, the distance being 42 miles and this stands as a record as far as home to home work is concerned. The path is not line of sight and signal strength varies greatly from day to day, apparently depending on the weather conditions. Don, 3XA, now has an eight element beam with a plane reflector up 20 feet high, but has been responsible for a great increase in his signal.

8RW has been unable to get through to McCrae from his home location due to a higher ridge to the north of his home. However on taking his portable to the top of the ridge Ken has worked 8RR with 86 signals. On the 26th November, Ken, 8ANW, operating from Heide, looked up 8RR at McCrae, 80 miles and 800 feet a.s.l. and worked 8RR at McCrae with 80 plus signals both ways. A large number of Geelong items accompanied Ken and some contacts to the band are hoped for. 8AWE, of Geelong, is busy building gear and should be on before this appears. 8ARF of Black Rock, is another newcomer using a pair of 8C1225s and 8RR receiver. He has worked 3DA, 7 miles, with 50 signals and has heard and been heard by 8RR and has probably worked him by now.

CORRESPONDENCE

The opinions expressed in these letters are the individual opinions of the writer, and do not necessarily coincide with those of the publishers.

THE VK-ZL CONTEST—1949

30 Prospect Ter, Kelvin Grove, V1, Brisbane

Editor, "A.R." Sir,

May I use some of "A.R.'s" valuable space to air some of my "beefs" regarding this year's Contest?

Firstly, how come the lack of publicity for the Contest overruns this year? Far too many stations came back and asked how, why and such, that it would certainly appear they didn't even know the contest was on and take it from them, P.E. did not give adequate notice to overseas Stations, and those Societies did not therefore have time to publicise one contest, let alone two. Hence the apparent lack of co-operation from the DX stations.

Secondly, why must we swap each an incredible serial number? It is far too complicated (especially if you have to do it from memory) and it is an overseas man who wants to know the rules. Can't we use a simpler system? I suggest we adopt the procedure used by the R.C.I. Club, the R.S.T., followed by "001" for the first contact, "002" for the second and so on. Much simpler, much quicker, and certainly not complicated.

Thirdly, why make it a VK-ZL Contest at all? Aren't we getting enough now to have our OWN Contest? I'm not kicking the ZLs—bad surely we and the ZLs could have separate contests. I would like

to see the DX Contest solely an Australian (and W.I.A.) affair.

Fourthly, why wasn't the Prize List announced at the same time as the Rules? P.E. certainly knew the Contest was coming off in October, so why wasn't the list ready then?

Having got that off my chest, I would like to say a word of thanks to the Contest Committee for changing the time limit rule. The old 48 hours and now 24 hours is a lot easier to do. I am sure endurance contest. This new version of 24 hours only from "go" to "whoa" is much better, and I suggest the Club should get support on this point from most of the fellows.

Though not actually a "beef," I cannot conclude without remarking on the long time it took to get the results of last year's effort in print! Surely a fellow doesn't have to wait for 13 months to find out how he did! After all, the A.R.E.L., "CQ," and R.E.H.L. Tolls are promulgated much faster than that, so what's the hold up?

The subject of the 1949 Contest will most certainly come in for an airing at the next monthly meeting of our Division, and further remarks along my line will no doubt come to light.

—R. CAMPBELL, VK4RC.

[On behalf of the Contest Manager and Federal Executive, I have been asked to reply to the above letter. Of necessity the answers must be brief, but a full report will be given at the 40th Convention.]

1. The Rules were not ready for publication until the 1st August as comments were awaited from the N.Z.A.R.E. of any alterations from the 1948 Contest. Airmail copies were sent to the main Societies and the publication of the Rules was delayed. The only other reason for the inactivity or lack of interest by overseas stations can be attributed to the too many DX stations who obtain the year's results, so what's the hold up?

2. General Business Item of the 18th Convention moved by VK8 and seconded by VK4 recommended the present system of numbering. At present a vote is being taken on the I.A.U. on behalf of the W.I.A. for a uniform system of aerial exchanges.

3. It is doubtful whether this is the unanimous wish of VKs and may cause the N.Z. Division and others urged the re-opening of the pre-war VK-ZL Contest and P.E. was directed in this way.

4. Mr. Campbell apparently doesn't realise that Manufacturers, despite their generosity, have to be approached for prizes and usually take some time to reply. In this case, they were still holding prizes for the 1948 Contest, and it is probable that they have not been advised by the N.Z.A.R.E. and, incidentally, the full results are not yet to hand. This latter point is no fault of your Contest Manager, who has been very busy since the 1st of the year, still not borne fruit.—W. MITCHELL, Federal Secretary.

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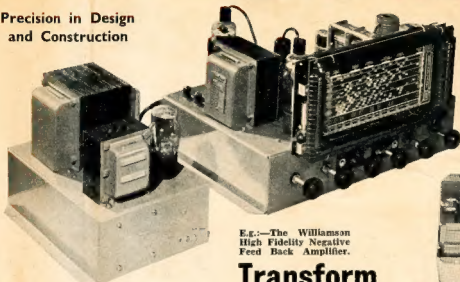
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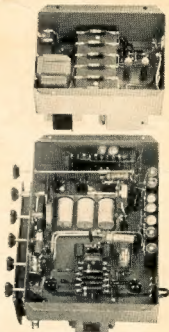
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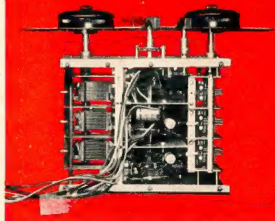
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